MOTOR AGE

Vol. XXX
No. 11

CHICAGO, SEPTEMBER 14, 1916

Ten cents a copy
Three dollars a year

TAKE OUT THAT KNOCK

WITH

JOHNSON'S CARBON REMOVER

THAT knocking in your engine and the difficulty you have climbing hills is due to just one thing—carbon in your cylinders. Why pay from $3.00 to $5.00 for having the carbon burned out when you can quickly do it yourself for 85c—without laying up your machine—without even soiling your hands.

Saves Gasoline

Clean cylinders reduce the consumption of gas and oil and give you the maximum power and speed from the minimum amount of fuel. Johnson's Carbon Remover really costs you nothing because the saving in fuel effected by its use will more than make up the price of the Carbon Remover.

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Do you remember how your engine ran the first 500 miles—quietly and full of snap? You, yourself, can easily keep it always in that condition. Free-from-carbon cylinders are the secret. An application of Johnson's Carbon Remover every 1000 miles will keep your engine always at its highest efficiency.

Unconditionally Guaranteed

We guarantee Johnson's Carbon Remover without equivocation. No matter how much you use or how you use it, Johnson's Carbon Remover cannot injure any part of your motor. You could soak your engine in it for days without the slightest injury.

Insist upon your accessory dealer or garageman supplying you with JOHNSON'S CARBON REMOVER.

S. C. JOHNSON & SON - Racine, Wis.

"What a Fool"—

—said a man the other day as he watched a perspiring car owner laboriously inflating his tires by hand.

"For the modest sum of $12 that man can get a Stewart Tire Pump—let his motor do the work and get full mileage out of his tires in the bargain."

Dealers—tell this to every car owner that comes into your sales room and you'll do business!

"It will pay you to see that the car you buy is equipped with Stewart Products".

The Stewart-Warner Speedometer Corporation
Chicago, Ill., U. S. A.

Stewart

Motor Driven Tire Pump

$12

MOTOR AGE

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ANNOUNCEMENTS

In next week's issue is described and illustrated the scenic wonderland of Arizona—a trail from Phoenix to Globe. The trail is said to follow a path that the Apaches began.

2600 Dealer Inquiries in 30 Days

These are the results one car manufacturer accomplished through advertising exclusively in

Motor Age

The Automobile

and

Motor World

If you want the details send for pamphlet "A Vital Force"

MOTOR AGE
Mallers Building, Chicago

Why I Am a Studebaker Dealer

In five years experience as a distributor I have been forced by one condition or another to change lines three times during that period.

Realizing the importance of selecting a connection that would be permanent, I began a careful comparison of various cars. After several weeks of thorough investigation I decided upon Studebaker—because, with their experience and unexcelled manufacturing facilities coupled with their vast financial resources, I was convinced that the Studebaker Corporation is in position to produce a car, not only of matchless value, but at a price that would make a competitor bite his tongue when Studebaker was mentioned.

I am proud to say since handling your product eleven months, I have not had one single cause for regret.

Capital City Auto Co., Inc.
New Orleans, La.

by

Fred Stahlin

President

Studebaker

THE experience of Mr. Perkins and his associates is by no means unusual. Oftentimes, of course, this shifting about from one make of motor car to another is nothing more than short-sightedness on the part of some dealers; but there will always be exceptions and the Capital City Auto Co., Inc., seems to be one of them.

Likewise there are other members of the Studebaker dealer organization who came into the ranks with anything but pleasant recollections of former business connections, but under the influence of the Studebaker policies of service and co-operation have not only increased their profits materially but their efficiency and enthusiasm as well.

And what we have done for these men, we can do for you too—that is if you are interested in Studebaker cars and profits present in their sale.

STUDEBAKER

Detroit, Mich.

South Bend, Ind. **Walkerville, Ont.**

Address all correspondence to Detroit

Vol. XXX No. 11 Chicago, September 14, 1916 $3.00 Per Year

MOTOR AGE

Fake Photography and Motor Cars

Car faked on Mt. Roubidoux, Cal. The figures were first faked in and the car with the small boy were faked in later for publication, prints of other parts of the picture being used in other papers for different purposes

Western Ingenuity Makes Machines Do Stunts; Craft Has Become Regular Profession

By A. G. Waddell

OBTAINING money under false pretenses is a felony; but obtaining money by deceiving the public with cleverly faked photographs, is a modern science.

Fake photography is a lucrative and alleged honorable profession followed by many worthy wizards of the lens. These camera fakers make human beings, animals and machines, especially machines, do the most unheard of things, things that are absolutely impossible, yet they prosper and wax rich in E. Pluribus Unum.

Many Photographs Composites

The composite photograph has worked into many lines of business; but in no other field does the fake photograph artist meet with such great success as in the motor industry. Motor cars are made to accomplish the impossible and the dealers are always willing to pay well for such photographs for advertising purposes, or rather, for the publicity manager's use.

The most expert practitioners of the bunco art work in the motor car press agent field. Newspapers and journals published throughout the country, have almost without exception, at one time or other, been faked by the faker, and in turn, have faked the public, though unknowingly. In southern California, where fake photos were first used in connection with the motor industry, the motor car editors will not accept an unusual photograph until they have been assured that it has not been faked, the practice has become so common within the last 2 years.

Like the jitney bus, the cafeteria, the dairy lunch and many other novelties, fake photography had its origin in California. It made its first appearance in the motor car industry, in Los Angeles. Keen competition in the motor car publicity field developed the first crude attempts at composite photography and the practice became popular with the motor press agents.

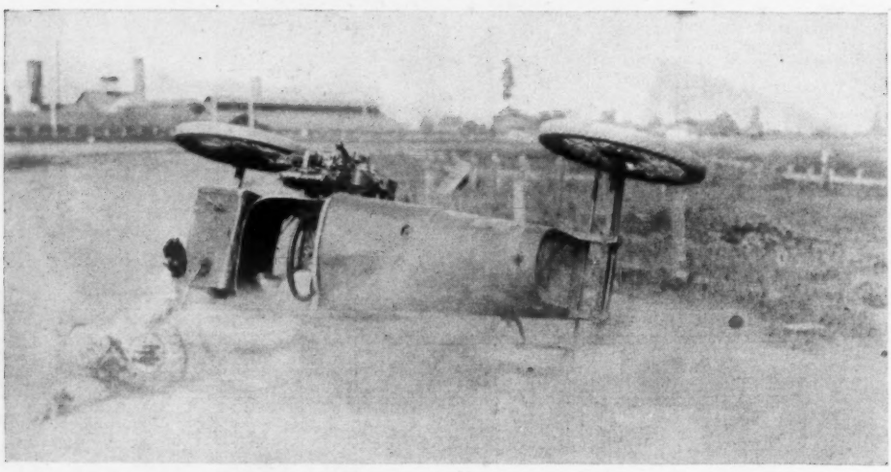
The pioneer fakes attracted attention. That was all the press agents wanted. From that time on the picture fakers could always find a ready market for their fakes.

Photograph Useless Evidence

While the motor car editors have always been hit harder by the photo faker than other literary watchmen, faked and composite contributions have appeared in all departments of the papers of southern California, from the sporting section to the daily and foreign news sections. Fake photos showing events of national importance, have been published. Fakes of mechanical freaks are common and the photographic wizard is a champion nature faker.

There was a time when it was said that

Faked race finish. Streak of light in center shows where picture was grafted



This fake was published throughout the country. The car was turned over and dust thown into the scene to give desired effect

This fake photo was made up to illustrate a California flood yarn in a daily paper. The woman is the wife of the photographer. The body of the man wearing the Deputy Sheriff's badge, which was borrowed, is a prominent Los Angeles motor car man. The head was faked on from a collection of stock heads and the pathetic scene was made in a hallway with the aid of a flashlight

photographs did not lie. That is not the case now. A photograph is useless now as evidence.

During the sensational graft trials in San Francisco, newspaper photographers were excluded. No cameras were allowed to pass the portals of the court room. A young "cub" photographer volunteered to get some stuff if allowed to tackle the job. He secured permission and started out.

A huge law book was hollowed out, a film camera with a high speed lens was placed inside. There was a hole through which the lens shot and there was another which gave the operator a look at the finder. With this equipment the "cub" secured a great layout and many of the principals were shot several times.

The photographs the next day created a sensation but it was impossible to get any more, so the cub suggested that they make some. "How?" demanded the head of the art department.

The cub showed how it was done. He faked up another sensational layout by pasting different heads on some of the bodies and changing positions somewhat, to illustrate the story of the day. A short time after this, the cub joined the staff of a Los Angeles paper and when the motor car editor wanted to get a photo of a machine racing an aeroplane, the cub produced the desired effect and it fooled even the scrutinizing managing editor.

Faking a Profession

That was the start. Now some photographers would rather make a fake than a real artistic photograph. They enjoy faking the public. It is now impossible for a man to score a sensation with a motor car as some other dealer will go one better with a fake.

The first fakes were crude and it is a wonder that they were even given a chance by the editors; but as the editors began to get particular and to recognize a fake occasionally, the fakers became more careful and took more pains. Now the fakes are carefully done and they are not so easily recognized by the public, while the editors have grown careless and they don't care.

There is a difference between the rank fake and the composite photo. Where a man uses a fake background, such as that of a mission or a California bungalow, to set off the car, it would have been possible for the car to have been photographed in that place but for convenience sake, it was composited. But where a car is placed on an elephant's back with four men in it, it is a rank fake. It does no good and hurts not only the publication using it but the entire car industry.

A motor car dealer on the Pacific coast paid $12 for one photograph a short time ago. It was a rather expensive fake but he believed that it was worth it. He had sold a great number of cars of the same make and design to one firm. He wanted a writeup on the big deal but he did have the cars for immediate delivery

and knew that he would not have them as they would be delivered in small bunches as they were received from the factory. Still, he wanted a photograph of the great fleet of cars purchased by the firm to go with his story in the paper. He called his press agent and after a time the champion photographer was called. He asked if they had the demonstrator handy. It was in front of the place. It was photographed. It was then moved down the street a short distance and photographed. The photographer made prints, from the size of the car standing down the street almost to the size of the car as it appeared in the first photograph taken. These were pasted on the original photograph and rephotographed, giving the desired large fleet of cars.

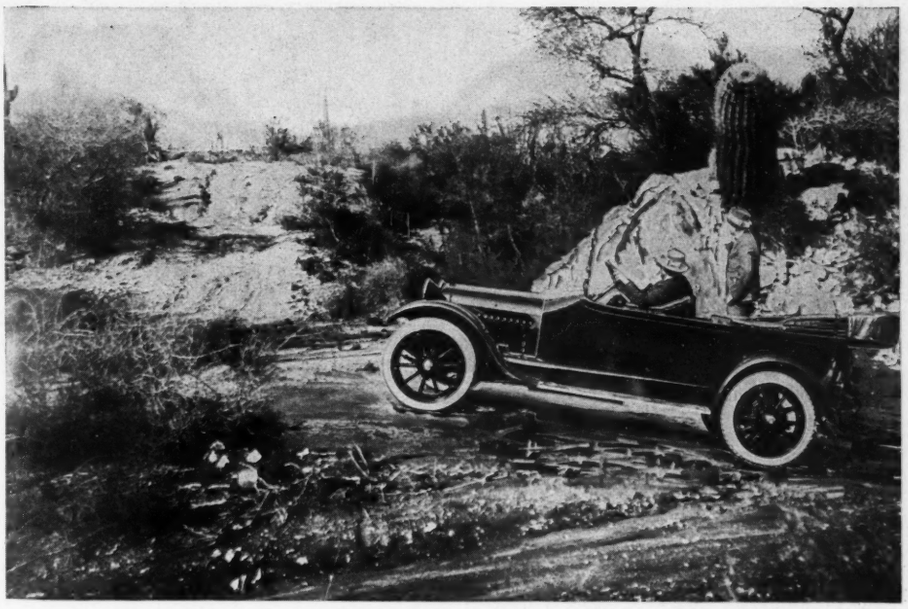
A short time ago the press agent for a large firm called his photographer and wanted a fake of one of the new models on the back of an elephant, showing the way the brakes held the car in position. The photographer protested. He said it was a crazy idea, one that would do the car no good as all who saw it would recognize it as a fake and that he did not mind making a dignified fake but a car on an elephant's back was beyond the limit.

The press agent fumed and threatened to give the photographer no more of his work. He looked over his glasses and pulled at the stringing ends of his artist's tie until the photographer agreed. The car was loaded with men who were instructed to look at the ground as the plate was made. The picture was taken on a side street just off from Broadway. The photographer had several elephants that he had photographed at the motion picture zoo and it was only a few minutes until the press agent was running to a motor car editor with his prized fake hollering for a write-up on the wonderful stunt. While the print was still wet, extra copies were ordered to be sent East to the factory where they will be sent out to more papers and probably some magazines.

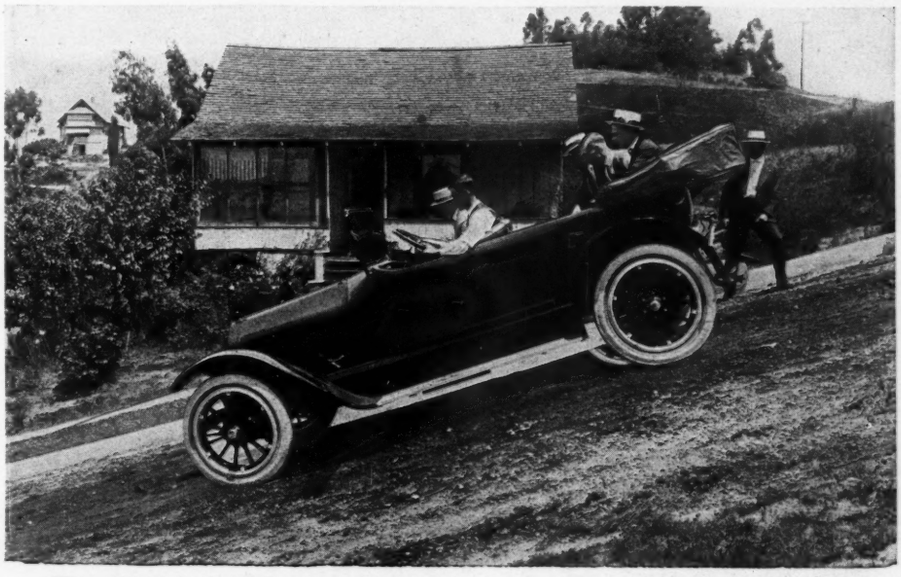
Wanted Elephant Stunt

The same press agent was elephant struck. His photographer said that he had "elephantanitis." He wanted another elephant stunt, this time the elephant was to be lifting the front end of the car off the ground by the bumper iron, to show how light it was and how the set brakes held it from rolling back with the four persons in it. This was easy, the car was lifted from the front by a jack and the elephant faked in. The trunk was wrapped around the bumper with the aid of some water-colors and it looked as good as if it had been really done. But will it sell any cars?

A Los Angeles press agent conceived the idea of putting a car on the summit of Eagle Rock. His employer hold him to go to it and the next day the photograph was on exhibition. No car has even been on the summit of Eagle Rock and none ever will get there unless hoisted on a powerful



This scene, near Wickenburg, Ariz., is a clever fake. The car never saw Arizona, but was faked in over another car with the aid of a brush and paints



When the first photo was made the wrong car was used, so another was taken out and photographed and faked on

A composite in which five photographs were used

derrick or by a fake photograph artist. When eastern tourists, who saw the photo in eastern papers, come to California and pass Eagle Rock, they wonder how anyone had the nerve to say that they drove a car up to its top.

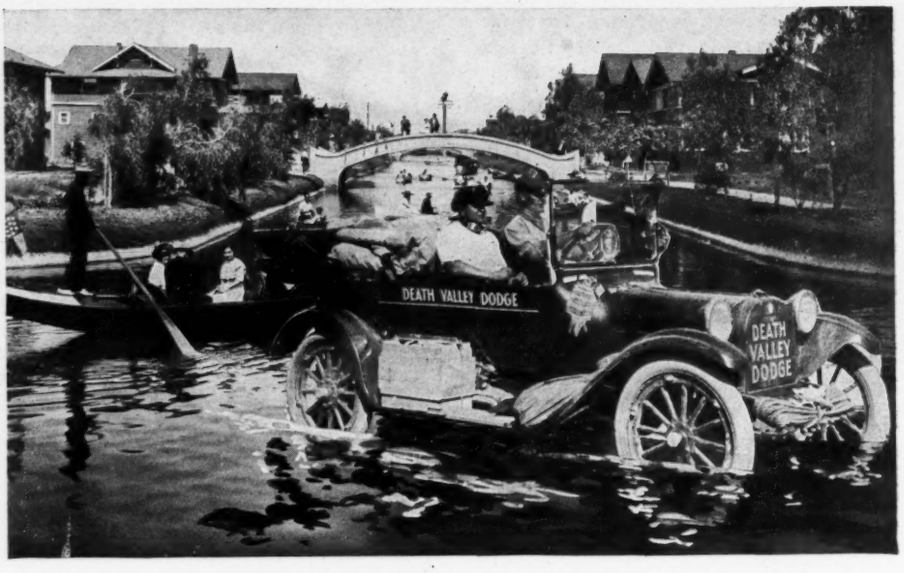
One Los Angeles dealer sent a car into Death Valley, anxious to prove the efficiency and durability of the car he was representing. All that he had to prove his assertions regarding the work of the car in the heart of the dreaded valley, was a roll of photograph film.

While the car was in the valley, another rival dealer's press agent went down in the bed of the dry Los Angeles river and made some wonderful Death Valley photos, turning the same over to a Saturday afternoon paper with a thrilling story for publication ahead of the real Death Valley car.

Fanciful Escape from Villa

The Villa raid on Columbus, N. M., gave rise to a great many wonderful escape stories. All of these were illustrated, the illustrations being taken in the river bed or among the old adobe ruins of San Gabriel. It is an easy matter to get two Mexicans to work for an hour or more in pictures for faking purposes mostly. For a single silver dollar a Mexican will be an outlaw, dead hero, friendly Cholo or Carranza soldier all day. It is easy to borrow rifles from the sporting goods stores with some knives and extra banderillos on the side. The Mexican picture actors will smear the mud on the car too and make no extra charge. What could be fairer than that?

A Los Angeles press agent conceived the idea of having Mrs. Villa, the first one by the way, and the one who lived in Los Angeles for several months in a beautiful home on the West side, make a wild dash from Los Angeles to the border to meet her Cholo outlaw husband called by some, Gen. Pancho Villa. The story was excellent but it was incomplete without Mrs. Villa in the car.



A crude fake, but one that would reproduce with excellent results in a newspaper. The canals at Venice, Cal., are too deep for a car to ford, but the faker did not know it. He probably never had been there

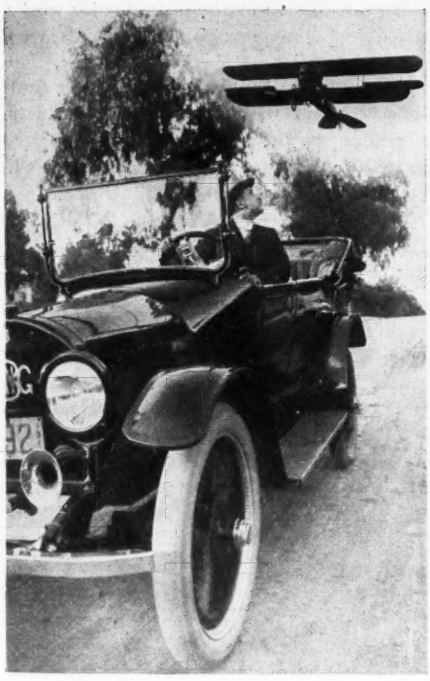
That was easy. A coon man sat in the car and was photographed to match a head that was cut from another photo, showing the Mexican woman staring straight into the camera. The head of Mrs. Villa was grafted on and the story was a great feature; but all bunk.

An excellent fake story about a man smuggling arms across the Mexican border in a car and with a photograph to prove it, was gotten up. Out at a motion picture camp the car was filled with guns and photographed. Then a picture of the International Monument at Tia Juana was used as a background. The feature de bunco was so good that it was turned over to the city editor for a great feature and then the writer got scared and told that it was a fake.

For a time there was a man living on the Pacific coast who made a business of selling fake stories and photos to papers and periodicals. All of his stories were illustrated. He used the motor car a great deal in his work too. One of his greatest fakes was a story of a miner living on the edge of Death Valley who rode across the floor of the valley to work each day, returning in the evening. His mode of transportation was a sail wagon and the wind

The aeroplane was faked first and the coyote was faked on later to illustrate a story. Published throughout the country. The worst faked story since Dr. Cook's

A silly fake that was published all over the country. This was one of the first daring fakes used in connection with the motor car industry



A careless fake job. The artist neglected to place a jack under the rear wheel and have it spin with the left front. However, the photo was published and the fake photographer received the usual amount for his work, but the fakers are becoming more clever as the business increases

changed every afternoon so that he could travel both ways.

A bum was picked up on the street and posed on a kid's coaster with a dinner pail. The picture was made in a back yard. The sail was an old piece of cover for a motor car. Another picture was taken in the river bed to get the Death Valley scenery and that was all that was necessary to make the story a knock-out.

The photo fakers make motor cars jump over cliffs, race with aeroplanes, descend into deep canyons and cover dangerous and unknown roads in foreign countries, all without taking the car off the paved streets. Many of the most sensational photos showing cars doing wonderful things are fakes. A large percentage of the cars shown in the fakes were photographed on the salesroom floor or in the alley in rear of the place.

There was a front page layout published in a Los Angeles paper last winter which was made up of 47 different pictures. The car was photographed in the salesroom. Some of the flowers used were photographed in Pasadena and others were taken in San Diego. The girls were photographed on the street posed as if playing in the snow and the snow scene was made on the top of Mt. Wilson, the water scene was made at Santa Monica and the desert scene was a left-over from the last Phoenix road race. The snow man was cut out of a book, touched up and rephotographed. It was then reduced to the proper size and worked into the scenery. It was a wonderful piece of art work but all faked. Faked like a large percentage of the motor car photographs used in newspapers,

This photograph was published in many sections of the country and was submitted in a prize photo contest. No car has ever been on the top of Eagle Rock, near Los Angeles, and none will ever get there unless hoisted on a derrick

not only newspapers of California where fake photography is so popular, but all over the country, for the California fakes find their way east.

Army Tests Motor Trucks

Vehicles on Border Put Through Strenuous Paces for 32 Consecutive Hours

SAN ANTONIO, Texas, Sept. 8—One of the most notable tests of army motor trucks was finished this morning when 20,000 men and officers and equipment of the First and Second Kansas infantry regiments arrived at Fort Sam Houston from Eagle Pass. The distance of approximately 200 miles by the route traveled was covered in 32 hours actual running time. The transportation train consisted of 132 motor trucks. It is stated that this movement establishes a new record for rapid overland transportation of troops. Two all-night camps were made on the trip—one at La Pryor and the other at Castroville. The finish to Fort Sam Houston could easily have been made last evening, but it was decided to spend the night at Castroville, about thirty miles out, and bring the troops into camp fresh this morning.

Major General Frederick Funston met the troops at Castroville last evening. He expressed himself as delighted with the success of the truck movement. Each of the four motor truck companies was made up of thirty-three trucks. Thirty of the trucks of each company carried twenty men each, and the remaining three to the company transported the field equipment and kitchens. All of the trucks were not filled to their capacity with men. The soldiers arrived here in splendid physical condition and high spirits.

"This test has proved that the movement of an army is not dependent upon railroads," was remarked by an officer who made the journey.

The cost of the experiment is to be tabulated so that the figures may be compared with the cost of a like movement by railroad.

KETTERING TALKS TEMPERATURE

Detroit, Mich., Sept. 9—Motor Temperature Control is the very interesting title of a paper to be presented at the next meeting of the Detroit Section of the Society of Automobile Engineers by C. F. Kettering, vice-president and general manager of the Dayton Engineering Laboratories Co. The meeting is scheduled for Sept. 14, and is to be held in the convention hall of the Pentchartrain Hotel. The society predicts a record-breaking attendance at this first meeting of the new season. Mr. Kettering is eminently qualified to give an authoritative paper on this subject, which is engrossing the engineering fraternity.

Owen-Magnetic Tour

Five Days Spent in New England with R. M. Owen in Role of Host

NEW YORK, Sept. 12—Special telegram—The 5-day tour of Owen-Magnetic cars through New England, just finished, was the most successful and unique tour ever planned. R. M. Owen invited approximately fifty of his friends, including dealers, private owners and newspaper men, to be his guests on this 5-day trip. Eleven Owen-Magnetic cars were employed and the route selected through New England was one of the most attractive to be found, embracing a circuit through the Berkshires, the trip over the famous Mohawk trail, one of the greatest mountain roads in New England, and a run to the White Mountains and thence to Boston and New York. Mr. Owen for years has been a great enthusiast of motor touring and the object of this invitation tour as well as three shorter ones a year ago, at all of which he played the role of host to the entire party, was to create renewed interest in touring. The Owen-Magnetic, with its freedom from gearshifting and clutch operation, adds a simplicity to car driving that affords an opportunity of great enjoyment.

Motor Products Buys Lozier Plant

Holding Company Prepares to Branch Out and Give Better Service

DETROIT, Mich., Sept. 8—A deal said to involve $1,000,000 has been closed here between the Motor Products Corp. and the Lozier Motor Co., whereby the large, modern plant of the latter company comes into the possession of the former. The Lozier company does not go out of existence by this move, however, for it will take over the plant now used by the Rands Mfg. Co., one of the subsidiaries of the Motor Products combine.

The Lozier plant is a large group of up-to-date factory buildings located on Mack avenue on the west side of the city, and covering about 62 acres of ground. There is a very attractive administrative building in front of the factory structures, and a powerplant for supplying ample power for all machinery. It was occupied by the old Lozier company prior to the reorganization, and has since been used for the manufacture of Lozier cars by the new Lozier concern.

Motor Products Corp. was organized in May of this year with a capitalization of 100,000 shares of no par value, as a holding company for several large parts manufacturers located in Detroit and vicinity. The Rands Mfg. Co., makers of windshields, tops and steering wheels; the Vanguard Mfg. Co., specialist in windshield manufacture; the Diamond Mfg. Co., producers of motor car metal stampings; and the Universal Metal Co., makers of metal parts and possessing a large tube mill, are all parts of the Motor Products Co.

The acquisition of the large Lozier works is the first step towards the concentration of the activities of the consolidation, and it is pointed out by one of the officials that the new plant will allow Motor Products to realize at once the fundamental purposes for which the company was formed.

The Old and the New

—St. Paul Pioneer Press

TRUCK FORMING PATENTS COMPANY

Detroit, Mich., Sept. 12—In order to form a concern to which other truck-forming attachment makers can pay royalty without any connection with the Redden name, a concern known as the Cook Attachment Patents, Inc., has been formed in New York with a capitalization of $30,000. The project is backed by Albert E. Cook, the millionaire popcorn king of Iowa and Illinois, whose patent covering truck-making attachments is now in litigation in Chicago. Mark W. Norman, a New York attorney, is named president and treasurer of the company, and B. H. Barber secretary. The ostensible purpose of the organization is to issue license to manufacture under the Cook patents, of which the Redden Motor Truck Co. at present is the only licensee. It is understood that the new industry will be unified in this manner.

The Redden attachment for Fords is one of many on the market to convert the Ford into a truck, but Redden seems to have scored over the rest by arranging with Cook. He also has an efficient ally in Cook, who brings into the situation not only his large experience in patent matters and his name, but also a determination to vindicate his inventive genius. Cook is said to have originally devised the truck attachment for work on his own farm lands some years ago, and later secured patent on it. The device covered by the Cook patent above mentioned consists of a truck frame, truck axle, truck springs, wheels and tires, so designed that it slides over a passenger car frame, and bolts through it, thus reenforcing the passenger car frame, and carries all the load. This claim seems very broad, and the patent bids fair to make trouble in the new business of making truck attachments.

Already Redden has filed suit against one of the truck-making concerns, it is stated, the Smith Form-a-Truck Co., Chicago, being the first to feel the attack. If the Cook patent proves to be basic all truck attachment makers will have to take out licenses, Redden believes.

STYLE DOMINATES HOOSIER SHOW

Indianapolis, Ind., Sept. 12—Style was the dominating note of the annual fall show of the Indianapolis Automobile Trade Association, held in conjunction with the Indiana state fair September 3-8. The exhibit, which was free, was held in a large tent which occupied a prominent location on the fair grounds. The show was notable for the absence of exhibits pertaining to mechanical construction.

Farming population being the heaviest

buyers of motor cars at the present time, the fact that the attendance was largely composed of this class, gave the different agencies an opportunity to get in touch with live prospects.

It was the belief of Indianapolis agencies following the show that excellent business prospects await the opening of the winter season. Many of the agencies have announced that the displays they had at the show will be continued at their city sales rooms during the current week.

ITALIAN TIRE BUSINESS GOOD

New York, Sept. 8—The tire industry in Italy is at present in a very prosperous condition. G. A. Pirelli, son of the owner of the Pirelli Tire Co., which employs 10,000 in its various factories, is visiting this country to make purchases of machinery and other supplies for his father's plant in Bicocca, Italy, Barcelona, Spain, and Southhampton, England. This company is the largest producer of tires in Italy and has been in the tire business 15 years. Over 1,500 pneumatic tires and tubes are turned out daily and truck tires number about 800 daily.

As there are only two other large tire concerns in Italy, namely Michelin and Tedeschi, the tire production is one of the most important branches of the motor car industry there, as it supplies nearly 130,000 cars and has little competition from other countries.

Mr. Pirelli states that there is little demand in Italy for American motor car products, especially low-priced cars. The purchasing of cars is by the wealthy class, who want expensive bodies and high-class finish, regardless of the price. The middle and poorer classes who cannot afford cars are satisfied to ride in the street cars, or if a long trip is made, to ride in a taxicab, which may be had at a very reasonable price.

NEW GASO-KEROSENE TRACTOR

Lodi, Wis., Sept. 9—The first models of a new gaso-kerosene tractor manufactured by Earl J. McFarland and John C. Westmont, Lodi, Wis., are now being exhibited at state and county fairs and given demonstrations on northwestern farms. The tractor is an assembled machine, the units being purchased from specialists. The use of a Bennett carbureter makes it possible to use gasoline, kerosene, distillate or motor spirits as fuel. The tractor pulls three 14-inch plows and has belt power for 18-inch silage cutters and 28-inch threshers. A 50 horsepower motor also is furnished. The motor is a Waukesha, with Eiseman magneto and Perfex radiator. The builders also use Clark universals; Foote gears; and Hyatt bearings. The axles, frame, wheels and drawbar are provided by the Electric Wheel Co., Quincy, Ill., and the clutch is a Borg & Beck dry disk. The universals are unique, being of the steamship type and new to tractor design.

Studebaker Plans for Big Expansion

Additions Will Enable Concern to Exceed $100,000,000 Annual Turnover

DETROIT, Mich., Sept. 8—Plant expansion to cost $1,500,000 has been announced by the Studebaker Corp., this applying to the factories here and at South Bend, Ind. When these extensive undertakings are completed, the capacity of the combined factories will make it possible for the corporation to exceed $100,000,000 annual turnover, according to A. R. Erskine, president.

Already contracts have been let for the construction of a large modern foundry and an extensive machine shop to be erected on part of the land now occupied for lumber storage at the South Bend factory. The foundry will be 1,100 feet long and 150 feet wide, with four cupolas and 250 tons daily melting capacity, and it is to be completed by July 1 next. The machine shop is to be about 900 feet long by 300 feet in width, and will double present machine shop facilities at South Bend.

Detroit contracts are now being let for the construction of a one-story building with about 25,000 square feet of floor space, adjoining plant No. 3, which is located on the west side of the city. It will be devoted to final assembly work. Another floor, measuring 50 by 300 feet, is to be built on one of the three-story buildings now used as a warehouse for materials. This latter addition will enable the still greater stocking up of materials in advance of immediate needs. Other extensive additions to the Detroit plants are to be made, but details of these are not given out at this time.

BUYS KLAXON HORN COMPANY

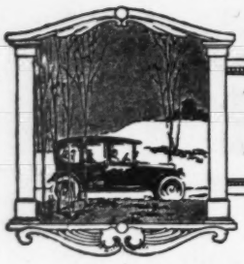
New York, Sept. 9—The United Motors Corp. has purchased the Lovell-McConnell Mfg. Co., Newark, N. J., maker of the Klaxon horn. There are now five prominent parts and accessory manufacturers in the United Motors Corp., the others being the Perlman Rim Corp., Remy Electric Co., New Departure Mfg. Co., Hyatt Roller Bearing Co., and the Dayton Engineering Laboratories Co., maker of the Delco starting and lighting system.

The name of the company manufacturing the Klaxon horn is to be changed to the Klaxon Co., and the capacity of its plant immediately doubled. This is necessary to take care of its greatly increased business. The Willys-Overland Co. has closed a contract with the Klaxon Co. for its supply of horns for a terms of years.

WATSON HAYNES ASSISTANT G. M.

Kokomo, Ind., Sept. 12—D. L. Watson, formerly general sales manager of the Haynes Automobile Co., has become assistant general manager and next in rank to A. G. Seiberling, who has been general manager of the Haynes company during the past 3 years. On Mr. Watson's promotion, Hugo R. Perry, who was assistant sales manager, became head of the sales department.

BULLET-RIDDLED DISPATCH CAR ON SOMME FRONT—This bullet-riddled French army car is proof that the age of miracles is not passed. The car carried three officers de liaison, dispatch bearers, across a dangerous zone of the Somme fighting front. German bullets pierced it through and through, ripping the tires to pieces. The officers reached their destination uninjured, thanks to the wonderful courage and coolness of the French chaffeur who stuck to his driving wheel though severely wounded in the right arm and left hand.



EDITORIAL PERSPECTIVES

"Ten, Twenty, Thirty" Races

IN most businesses, a plant costing in the neighborhood of a million dollars which is producing only 4 or 5 days out of the year would not be considered a paying proposition. That is, in effect, the state of affairs that is turning gray the heads of motor speedway managements. If the speedway is to be a financial success, the 4 or 5 days it is a source of income must be golden ones, to make up for the 360 lean days when the plant is an item of expense. Then there are the chances of rain which make necessary a postponement, always an expensive thing, and one which may turn a possible profit into a certain loss.

NO one realizes these facts better than the speedway officials themselves and some of them are casting about to find methods of making the plant produce—possibly on a smaller scale—at more frequent intervals. Officials of the Chicago speedway have taken the lead in branching out in new lines for minor attractions which may be used to keep the plant working in the intervals between big days. They are proceeding along somewhat the same lines the management of an opera house which runs moving pictures at popular prices between engagements of grand opera.

IN ITS search for what, in theatrical parlance, may be called "small time stuff," the Chicago speedway originated the amateur drivers' races and Sunday went a step further with the amateur Ford races. Both were successful as contests; both were completely free from accident and each provided an afternoon of sport for the spectators. Probably neither brought in a record for gate receipts, but neither was expensive to stage. Popular prices were the rule in the Ford race but Fords were no more in the majority Sunday than at the big races.

THE old fear that to turn loose twenty non-professional drivers at one time on a speedway is inviting a catastrophe does not seem to be proven. As compared with major league events, the times were slow, slightly over a mile a minute, but the competition was as good as one may see in any race. The grandstands became as excited over a brush between two sprawly-legged Fords fighting for place as they ever did when Resta teased de Palma in any major event. This seems to prove that the racing fans are not so speed-thirsty as most people believe and enjoy clean racing sport for entertainment as well as to see records fall.

THERE is talk of repeating Sunday's matinee at frequent intervals next year. Probably these will not be confined to Fords only. Will it not be possible to stage an Overland race or a Studebaker race or a Buick race or a Maxwell race, etc.? If the Ford races are to be continued as such, there should be separate classes for cars which at least look like Fords, and another for those whose identity has become completely lost in the rebuilding and remodeling process. Also, it is possible that there may be a demand for a sharper definition of a Ford car in future races of this kind.

Lincoln Highway Three Years Old

THE Lincoln Highway becomes 3 years old Wednesday of this week, for it was on September 13, 1913, that the proclamation of the transcontinental route and intent to construct a through connecting highway from the Atlantic to the Pacific coast was given to the public. Within the 3 years, great progress has been made toward the realization of the ideal of the founders—a complete well-improved highway across the continent. The work that has been done, the support the project has had, and the active plans for further work all along the route make it certain that before a great many more birthdays have come the Lincoln Highway will live up to its name of the Main Street of The Nation.

IT is not its present state as a transcontinental highway that is so worthy of praise, for it must be admitted that there are stretches which might be very greatly improved, but the praiseworthy feature is that, judging by the past 3 years, these stretches will be improved—and that before long. The Lincoln Highway at present is an ideal. But it is real in the splendid and fundamentally sound ideas it embodies. Tourists travel it by the thousands. Rural communities are profiting by the lesson it reveals of the value of better roads, and as a means of intercommunication. The Lincoln Highway is real in its actual physical value, for its entire length of 3,333 miles it is marked with a red, white and blue insignia of the national association. It is traversable for its entire distance as one through connected road—except where further improvement is in progress which naturally makes detours necessary.

BETWEEN $5,000,000 and $10,000,000 have been expended in its improvement to date. Eastern capital is being donated for the construction of certain stretches of the road in the west, where aid is most badly needed, and this marks the first instance of the kind in which individual assistance has been given to distant localities for the benefit of all the people. The Lincoln Highway, a road with a future which will overshadow the past of its predecessor, the Appian Way.

ANNOUNCEMENT

Next week Motor Age will begin a campaign for a uniform traffic law in all cities of 5,000 and over. First, a series of illustrations will be published, showing actual conditions in principal thoroughfares of our larger cities during rush hours. These will acquaint you with the deficiencies in present traffic laws and after this series of illustrations we will publish what we believe will prove a sane and practical set of rules for all cities. The campaign will be waged assiduously and with a view toward making all classes of city traffic move as smoothly as possible with the greatest safety to all. Watch for the opening campaign gun!

"When Is a Tourist," Asks International Wanderer

TACOMA, Wash., Sept. 9—The tour of the International Wanderer non-stop Maxwell, from Mexico to Canada and back again, came to an untimely end. The car has been confiscated by the Canadian government and is now locked in the king's warehouse at Vancouver.

The day after their arrival in Canada, the members of the crew of the car were hauled before the collector of customs at Vancouver and informed they had violated the laws of British Columbia and of the Dominion of Canada. They had entered British Columbia as tourists and were really in the country for commercial purposes, it is claimed.

The customs officials claimed that the signs on the car were advertising and that by displaying said signs on the car it was being used for commercial purposes, although Jack Griffin of the Maxwell factory vigorously protested his innocence. The officials at Vancouver have submitted a report of the matter to Ottawa and nothing can be done until the decision is rendered by the authorities at the capital.

ELECTRIC BUS OPERATING CHARGE

It costs 9 cents to run an electric omnibus a mile, according to the York Corp. Tramway Department, England. This organization has had over a year's experience with four electric omnibuses and finds that, after a total mileage of 65,470, this is the resultant figure. Making some additional allowances for a maximum tire maintenance, etc., this may be brought up to about 11 cents per mile, excluding standing charges.

An interesting feature of the method of carrying out this work is in the charging stations at the terminus of the route. The charging cable with plug attached is drawn up from the roadway box and connected to the bus. A small door is opened, a button pressed causing the machine to start up and commence charging. A second pressing of the button shuts down the plant.

CAPITAL-TO-CAPITAL TOUR

Detroit, Mich., Sept. 8—The Hupp Motor Car Corp. tour, which is sponsored by J. Walter Drake, president of the corporation, and which is known as the United America Tour in the interests of good roads, and planned to include in its itinerary all state capitals, has now covered the entire North Atlantic seaboard and is heading west.

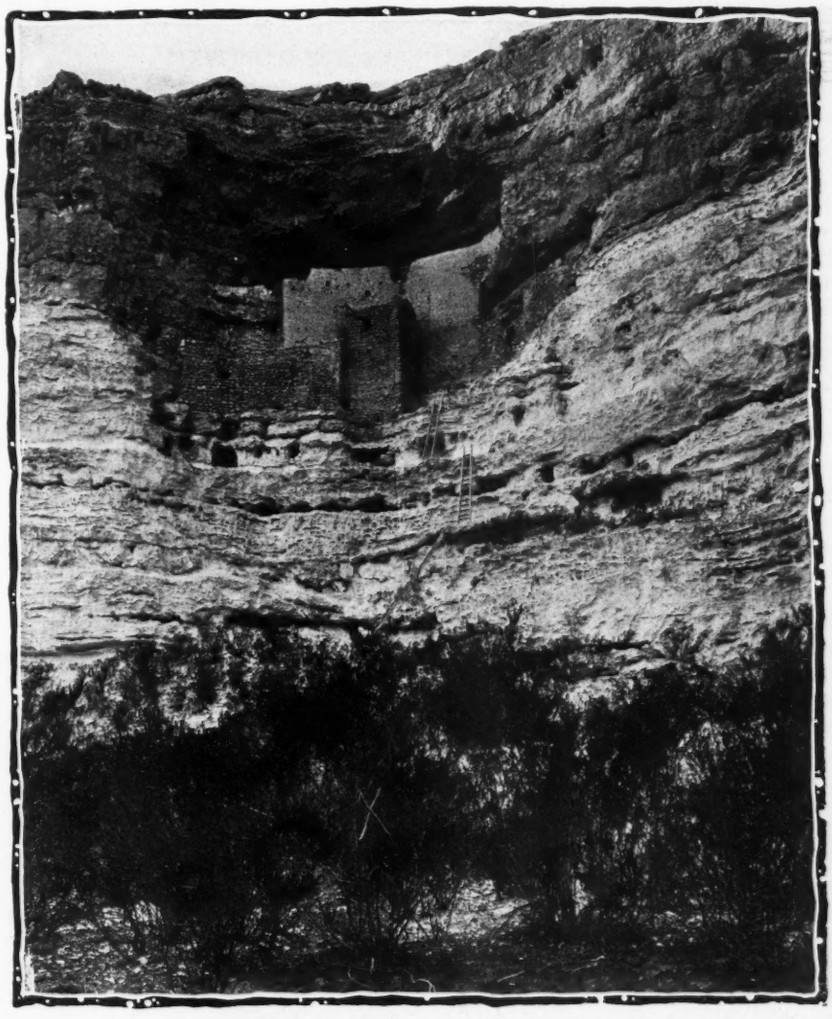
Good weather and fair road conditions so far have been encountered, and although much time is taken up by conferences with governors, receptions and the taking of motion pictures, the tenth day found the party well on its way, having reached the tenth capital, Montpelier, Vt.

Bearing credentials from the National Highway Assn., and with L. W. Page, United States Good Roads Commissioner, acting as official starter, the tour left Washington Aug. 28. Annapolis, Md., was the first capital visited, and after covering the New England states the party proceeded to Albany, now being on its journey across New York state to Buffalo, and thence to Cleveland on the way to Charleston, W. Va. After visiting the capitals of Kentucky and Indiana, the tour car will come to Detroit by way of Toledo, O. At Detroit, a reception has been planned, to bid the party God speed on the far western lap of its long run.

Peacock Charges Reflection in Motor Car Body

MISTAKING his reflection in a motor car body for another of his kind, a strutting peacock attacked the car of the Rev. H. J. Miller, while standing in front of a church, at Pennsburg, Pa., during services. The peacock passed the machine and seeing his reflection in the side of the car thought the bird was another of his kind and promptly challenged the rival. His tail dropped and then began a series of mad rushes against the side of the machine, damaging the finish of the car.

See America First . . . See America Now



NO. 95—MONTEZUMA CASTLE IN ARIZONA

ABOVE is shown Montezuma Castle, a name given to the cliff dwelling ruins that have been made a National monument. The castle is located on Beaver creek, between the Coconino and Prescott national forests in Arizona.

EDITOR'S NOTE—This is the ninety-fifth of a series of illustrations and thumb nail sketches of the scenic and historic wonders of America to be published in Motor Age for the purpose of calling the attention of motorists to the points of interest in their own country.

Air-Cooled Rotary Motors Common

German and French Aircraft Both Use This Type of Engine

Motor truck bringing in Fokker aeroplane captured from Germany by French. The motor is a rotary Oberursel, a copy of the French Gnome

CONTRARY to the general impression, the use of rotary air-cooled motors is not confined to the French aviation. The German army employs the Oberursel 8-cylinder, air-cooled, rotary motor on practically all Fokker scout monoplanes. The Oberursel is a direct copy of the French Gnome aeroplane engine, while the Fokker aeroplane is a repetition of the Morane machine. With the exception of her Fokkers, Germany fits all her aeroplanes with vertical water-cooled motors.

Benz Also Used

A few of these are six-cylinder overhead-valve Benz, with vertical pushrods and rocker arms; the great majority are Mercedes engines with inclined overhead valves operated by a single overhead camshaft. Mercedes began to develop this type of engine in 1912, and in order to make more rapid progress employed the same general design for both aviation and motor car racing. These motors are produced under the direction of Heinrich Haeder, head of the aeroplane and racing departments of the Mercedes company, who has as his assistant the race driver and engineer, Seiler, who ran in the last French Grand Prix at Lyons. The latest Mercedes production is a six-cylinder motor of 5.5 by 6.29 inches, bore and stroke, developing 178 horsepower at 1,450 revolutions per minute. All these motors have separate steel cylinders with sheet steel jackets common to a pair of cylinders and a pair of valves inclined in the head. It is only in the racing type that four valves are employed.

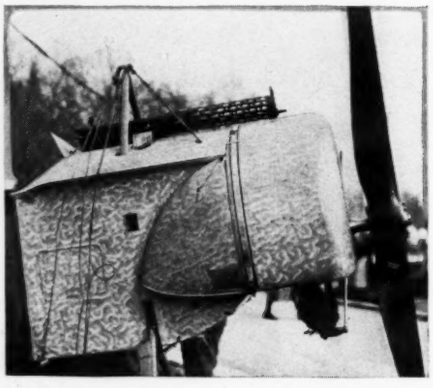
Steel cylinders have become very common not only in German aviation, but among the allies, since the success obtained with them by Mercedes, and indications are that this type of cylinder will be largely adopted for racing and high-efficiency car motors after the war. The construction is not costly, there are very few manufacturing difficulties, the combustion chamber is machined all over, water circulating space can be carefully verified, and the design is lighter than block-cast cylinders. In most cases cast-iron pistons are used but several manufacturers are designing these motors to run at 2,400 revolutions instead of 1,200, with the propeller geared down at a 2 to 1 ratio. This has necessitated lighter reciprocating parts and a considerable amount of successful experimental work has been done with aluminum pistons.

In the German army much importance is attached to uniformity of design and construction. Thus, motors are invariably mounted in the front of the fuselage, with the tractive screw on the propeller shaft and, of course, running at engine speed, which never exceeds 1,400 revolutions. During the early months of the war the radiator was mounted on each side of the fuselage; this, however, was an exposed position, any stray bullet being liable to break a tube and cause the total loss of cooling water.

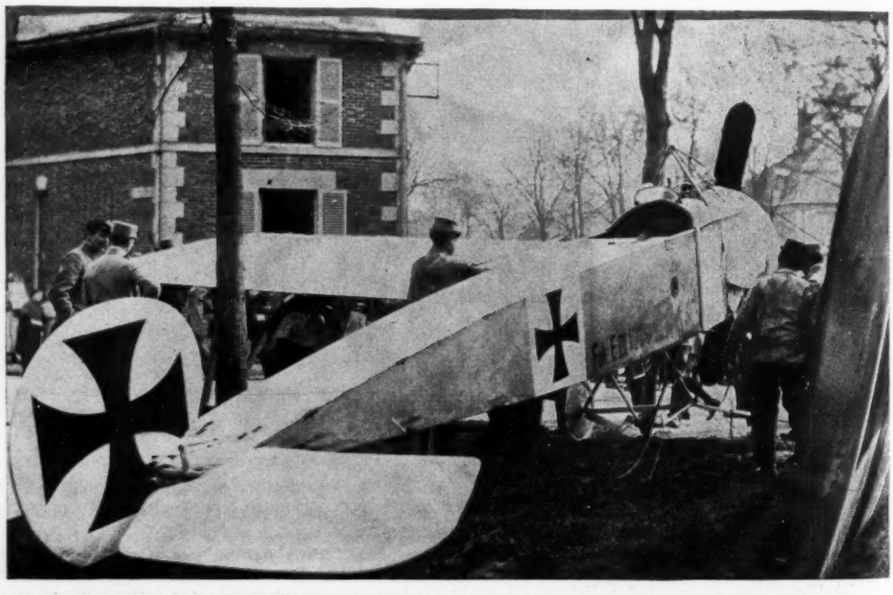
Radiators Honeycomb Type

More recently the radiators are of the honeycomb type, very similar to those used on cars, mounted in the center of the upper plane, with the head inclined considerably towards the rear. The entire cooling surface is above the top of the engine instead of being below it as on the old type, and the maximum protection is obtained against stray bullets. All German motors, whether Mercedes or other make, are partially silenced, the exhaust gases being drawn into a collector, and the exhaust pipe carried upwards and inclined to the rear to a point slightly above the top of the upper plane. With the exception of the Fokker all machines are biplanes.

Germany appears to have paid no at-



Engine housing and machine gun of a Fokker monoplane captured from Germans by French



German Fokker aeroplane captured practically intact by the French. The machine is a faithful copy of the French Morane

tention to V-motors. This can be understood in view of her passion for uniformity. Before the war a very satisfactory type of vertical six-cylinder water-cooled motor was evolved, and the German authorities have remained faithful to this type during the war. The French on the other hand have refused to be bound by a mediocre uniformity, and in the midst of the war have not hesitated to give engineers a free hand and adopt the best that they could produce. Thus, the 2 years of war have seen the decline of the rotary and the rise of the six-cylinder vertical and various eight- and twelve-cylinder V motors. The rotary has not been abandoned, for recently there has been a rise in favor of the Rhone engine. This motor, originally a rival of the Gnome, was bought up by the Gnome company 2 or 3 years ago and produced by it. It has been found more satisfactory than the original Gnome and is being built in bigger quantities than the Gnome.

Another development is the high-speed eight- and twelve-cylinder V-motor for aviation purposes. Instead of limiting the engine speed to 1,200 to 1,400 revolutions per minute, several firms, and particularly those with lengthy racing experience, have produced multi-valve eights and twelves running at 2,600 revolutions, with propellors geared down to 1,300. These motors appear to be giving satisfaction, for they have been ordered in very large quantities.

CONDENSE FREIGHT SHIPMENTS

It has been discovered by the R. Martens & Co., Inc., New York, exporting agents, that it is possible to save 50 per cent of the cubic space occupied by an ocean shipment of a motor truck. At the present freight rates it is much cheaper to spend the time on shore, condensing the truck, than it is to pay the additional rates. So important has this saving of cargo space appeared that, according to the house organ of the company, a factory has been leased at Stapleton, L. I., as a dismantling and packing room. The illustration herewith shows a truck in the act of being dismantled.

The saving in freight cost is not the only gain by the method of condensed packing. When cargo space is scanty a desired shipment may be made impossible by bulk in excess of obtainable space or only part of a total shipment may be made instead of the entire amount. The Martens company states that in June it shipped twenty-four motor trucks packed by the condensed shipment system and in a space that ordinarily would not have held more than twelve similar trucks. A second shipment of twenty-five trucks, also packed condensed, went forward a week after the first shipment, and altogether a total of ninety-nine motor trucks were sent off in a month in the amount of hold space which would ordinarily not accommodate half this number.

Milwaukee Fall Fair Show Opens

Last Year's Plan of Charging Admission Adhered to This Year

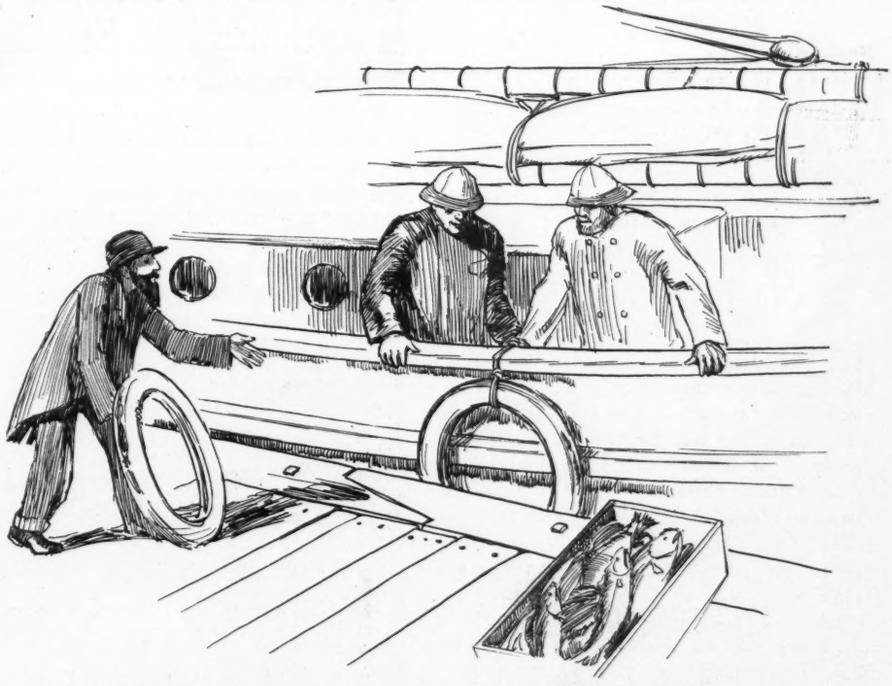
MILWAUKEE, Wis., Sept. 11—Once inside the mammoth Automobile Hall at State fair park, West Allis, as it is arranged and decorated this year for the annual fall show of the Milwaukee Automobile Dealers, Inc., not one in a 100 visitors could possibly fail to believe he had walked into the Milwaukee Auditorium in January to see the splendid exhibition of the latest issue of American motor car industries. Not only is this year's show one of the finest ever put on at any state fair in the country, but doubtless it is better and more exteisive in every way than the best previous effort made by the association, winter or fall. Fifty-two Milwaukee dealers are showing cars, and twenty-two accessory houses have displays of parts, supplies and luxiries and necessities.

This year's Wisconsin state fair is a 7-day show, having been opened at noon on Sunday, September 10. Although the formal opening of the motor show took place at 10:30 o'clock this morning, nearly all of the exhibits were in place and the show ready for inspection by Sunday afternoon. It was a splendid illustration of the workings of a splendid system of conducting a show. Early visitors were not postled about while begrimed roustabouts pushed cars into place or swept refuse from the floor, as seems to be almost traditional in motor show history.

Approximately 10,000 people visited the fair on Sunday, and today's attendance is estimated at more than 35,000, but today was children's day and the total includes thousands of schoolboys and schoolgirls. Nevertheless, nearly 4,500 people visited the motor show, and the M. A. D. considered the day's business eminently satisfactory. Of all days of the fair, today proved the wisdom of charging a 10-cent admission to the motor show, for but few of the children were able to pay their way in and the exhibitors thus were not troubled by swarms of youngsters who delight in being where they shouldn't be.

Dealers Have Exclusive Use of Building

The Wisconsin state fair is probably the only one in the world which makes a very special arrangement for the care of the motor division. Like last year, the state fair board leased what formerly was Machinery hall, to the M. A. D. at a lump sum and gave the dealers exclusive use of the big structure, a reinforced concrete hall measuring 140 by 430 feet, fully enclosed with fenestra glass, making it as secure from the elements as the Chicago Coliseum or the Milwaukee Auditorium. In this building the M: A. D. laid out approximately 100 spaces, about 25 more than last year. Even the reduction of individual spaces did not make enough room available for all applicants. The mammoth floor space is divided into six rows of spaces, the west wall being reserved for the accessory people.



NEW USE FOR TIRES—A new use has been discovered for discarded motor car tires at Boston, Lynn, Gloucester and other Massachusetts sea towns where there are many fishing boats. Someone discovered that the old tires hung over the sides of the boat make excellent fenders to prevent the craft from being bumped too hard against wharves, and so whenever any of the junk men get some of them he sells them to the owners of the small fishing boats.

Aitken and Hughes finishing 50-mile race. Hughes was only .27 second behind the winner. Insert shows Hughes and Aitken just after their sensational finish

Aitken Sweeps Indianapolis Card

All Three Events Closely Contested—Winner Drives 8 Miles with Broken Steering Arm

By William K. Gibbs

INDIANAPOLIS SPEEDWAY, Sept. 9—Fate was good to Johnny Aitken today. Going into the 100-mile event, the third on the card, after having taken both the 20-mile and 50-mile dashes, his Peugeot showed the way, and with the confidence gained in his two earlier wins, Aitken jumped into the lead. However, Rickenbacher had kept his Maxwell out of the first two races, purposely to save it for the one in which points towards the season's championship were to be awarded. Aitken found Rick crowding him hard and it was a battle royal between the two, who paced the field and kept well in the lead most of the time throughout the race.

Aitken led, but never for more than 100 feet, up to the end of the twenty-third lap, when Rick plunged out in front for one circuit of the track, Aitken heading him on the next circuit. Johnny held the lead until the thirty-third lap, then Rick lead for one circuit, Aitken going into the lead again for two laps, or up to the 90-mile post. It was on the next lap after this that the steering arm on the right wheel of the Peugeot broke and Rick began to walk away from Aitken as if the latter were tied. Pit attendants signalled Rick to watch his right rear wheel, which was wobbling considerably and proved his undoing just when victory seemed within his reach, for Aitken was in serious trouble. With but little more than 5 miles to go and when he was leading Aitken by almost a mile, Rick came out of the west turn into the homestretch at high speed and his right rear wheel dished and this caused the left rear tire to go. Much credit is due Rickenbacher for his masterly control of the Maxwell under

TIMES FOR THE 20-MILE EVENT

Car	Driver	10 mi.	20 mi.	Speed	Prize
Peugeot	Aitken	6 :26.54	12 :37.35	95.08	$400
Premier	Wilcox	6 :26.94	12 :37.68	95.03	300
Sunbeam	Chevrolet	6 :41.65	13 :12.88	90.82	200
Hoskins	Hughes	6 :55.36	13 :36.90	88.04	100
Premier	Lewis	7 :09.80	14 :03.85	85.33	
Peugeot	De Palma	7 :16.00	14 :04.62	85.24	
Duesenberg	Buzane	7 :10.90	14 :11.34	84.58	
Ostewig	McNey	7 :32.96	15 :52.18	75.60	

Henderson and Klein both out early.

TIMES EVERY 10 MILES IN THE 100-MILE EVENT

Car	Driver	10	20	30	40	50	60	70	80	90	100	Speed	Prize
Peugeot	Aitken	6 :29.92	13 :04.37	19 :47.75	26 :31.93	33 :16.90	39 :59.40	46 :39.99	53 :25.25	59 :51.84	1 :07 :05	89.44	$3,500
Hoskins	Hughes	6 :43.69	13 :27.15	20 :14.17	27 :17.80	33 :58.45	40 :38.54	47 :22.20	54 :08.60	1 :00 :50.24	1 :07 :24	89.01	2,000
Duesenberg	D'Alene	6 :45.54	13 :34.96	20 :12.72	26 :52.89	33 :35.53	40 :13.47	46 :52.28	53 :40.88	1 :00 :40.73	1 :07 :43	88.60	1,200
Duesenberg	Buzane	7 :02.21	13 :57.45	21 :07.62	27 :59.80	34 :44.50	41 :32.28	48 :21.45	55 :06.66	1 :01 :47.54	1 :08 :37	87.44	1,000
Premier	Lewis	7 :01.31	13 :47.76	20 :33.71	27 :17.34	34 :01.39	40 :50.44	48 :49.89	55 :31.21	1 :02 :17.71	1 :09 :07	86.81	600
Omar	Toft	7 :16.90	14 :28.15	21 :59.34	29 :16.93	36 :30.75	43 :48.13	51 :07.40	58 :24.30	1 :05 :35.19	1 :12 :40	82.56	400
Maxwell	Henderson	7 :06.88	14 :11.75	21 :33.21	28 :58.89	36 :18.78	42 :42.84	51 :03.57	58 :22.70	1 :05 :36.41	1 :12 :43	82.51	300
Peugeot	De Palma	7 :01.66	13 :56.60	21 :06.65	27 :58.17	34 :43.30	.....	49 :21.83	56 :26.54	1 :05 :49.61	1 :13 :12	81.96	
Maxwell	Rickenbacher	6 :30.37	13 :04.93	19 :48.56	26 :32.36	33 :17.44	39 :59.72	46 :40.59	53 :25.85	59 :52.27	Wrecked 38th lap.		
Ostewig	McNey	7 :49.17	15 :49.76	23 :51.30	31 :57.30	39 :42.68	47 :45.68	55 :36.35	1 :03 :37.71	Flagged 36th lap.			
Premier	Wilcox	6 :56.48	15 :22.58	21 :59.62	29 :50 90	Out 8th lap.	Quit.						
Duesenberg	Milton	6 :50.36	14 :04.46	Out 8th lap.	Ignition trouble.								

Equipment Used in Indianapolis Harvest Racing Classic

Car	Driver	No. Cyl.	Bore	Stroke	Distance	Carb.	Plugs	No. Plugs	No. Valves	Valve Open	Tires Make	Tires Size	WB.	Pistons	Oil
Peugeot	de Palma	4	3.70	6.65	274.0	Zenith	K L G	4	16	Over	Silvertown	35x5	106	Aluminum	Oilzum
Premier	Wilcox	4	3.65	6.63	274.5	Miller	K L G	4	16	Over	Goodyear	35x5	105	Magnalium	Oilzum
Omar	Toft	4	3.75	6.75	298.2	Miller	Rajah	8	16	Side	Silvertown	35x5	106	Magnalium	Oilzum
Peugeot	Aitken	4	3.65	6.65	274.0	Zenith	K L G	4	16	Over	Silvertown	35x5	106	Aluminum	Oilzum
Maxwell	Rickenbacher	4	3.75	6.75	298.2	Miller	K L G	4	16	Over	Silvertown	35x5	106	Aluminum	Castor
Duesenberg	D'Alene	4	3.75	6.75	298.2	Miller	Rajah	8	16	Side	Silvertown	35x5	106	Magnalium	Oilzum
Maxwell	Henderson	4	3.75	6.75	298.2	Miller	K L G	4	16	Over	Goodyear	35x5	106	Aluminum	Castor
Sunbeam	Chevrolet	6	3.28	6.14	294.2	Miller	K L G	6	24	Over	Silvertown	35x5	113	Alum. Al.	Castor
Duesenberg	Milton	4	3.75	6.75	298.2	Miller	Rajah	8	16	Side	Silvertown	33x5	106	Magnalium	Oilzum
Duesenberg	Buzane	4	3.75	6.75	298.2	Miller	Rajah	8	8	Side	Silvertown	33x5	106	Aluminum	Oilzum
Duesenberg	Klein	4	3.75	6.75	298.2	Miller	Answer	8	16	Side	Silvertown	33x5	106	Magnalium	Mobiloil
Hoskins	Hughes	4	3.75	6.75	298.2	Miller	Rajah	8	16	Side	Silvertown	35x5	106	Aluminum	Monog'm
Premier	Lewis	4	3.65	6.63	274.5	Miller	K L G	4	16	Over	Silvertown	35x5	105	Magnalium	Oilzum
Ostewig	McNey	4	3.34	5.00	295.2	Miller	Rajah	8	16	Side	Silvertown	33x5	102	Magnalium	Oilzum

All used Moto-Meters and all cars were equipped with Hartford shock absorbers. All used Bosch ignition, except Chevrolet, who was Thomson equipped. R.-W. wheels for all except Ostewig, Rickenbacher and Henderson, who used Houk.

these conditions. His car careened first right, then left, then right again, and just when four cars seemed about to hit him broadside, for he was directly across the track, Maxwell began sliding backwards and just in the nick o' time gave the right of way to the cars bearing down upon it. Rick and his mechanic, George Henderson, were in their seats when the car came to a standstill and the cheers that greeted them as they walked to the pits was equal to that usually accorded any winner. Aitken drove the last 8 miles with only one front wheel attached to his steering apparatus.

Indianapolis appeared to have been surfeited with entertainment, the state fair having closed yesterday, for there did not seem to be over 10,000 to 12,000 present at the races, which were the fastest ever seen on the Indianapolis track up to the time Aitken broke his steering arm and had to slow down. At that the 100-mile dash was considerably faster than the 300-mile event last Memorial day and nearly equaled de Palma's speed when he won last year. The 20- and 50-mile events were won at 95.08 and 91.83 miles per hour, respectively.

The 100-mile race was characterized by two battles, that of Rickenbacher and Aitken and one between D'Alene and Hughes. From the thirtieth to the ninetieth mile Hughes had been fighting D'Alene for third place and when Rickenbacher wrecked, Hughes jumped into Rick's place, passing D'Alene in the home stretch.

Buzane Moves Up

George Buzane, one of the surprises of the Cincinnati derby, where he won fourth place, repeated today in the 100-mile event. He had the pole position at the start, having drawn No. 1, but was soon in eighth place after the race started. However, at the end of 20 miles Milton docked his Duesenberg with ignition trouble and Buzane jumped into seventh place just inside the prize money. De Palma's and Lewis' stops for tires at the 72-mile point gave Buzane fifth position and the falling of Rickenbacher put him in fourth where he finished.

In the 20-mile event Aitken took the lead from the start and won at 95.08 miles per hour, although Wilcox gave him a hard battle, finishing only .33 second behind. Chevrolet drove the Sunbeam that Galvin took third money in at Cincinnati last Monday and finished third.

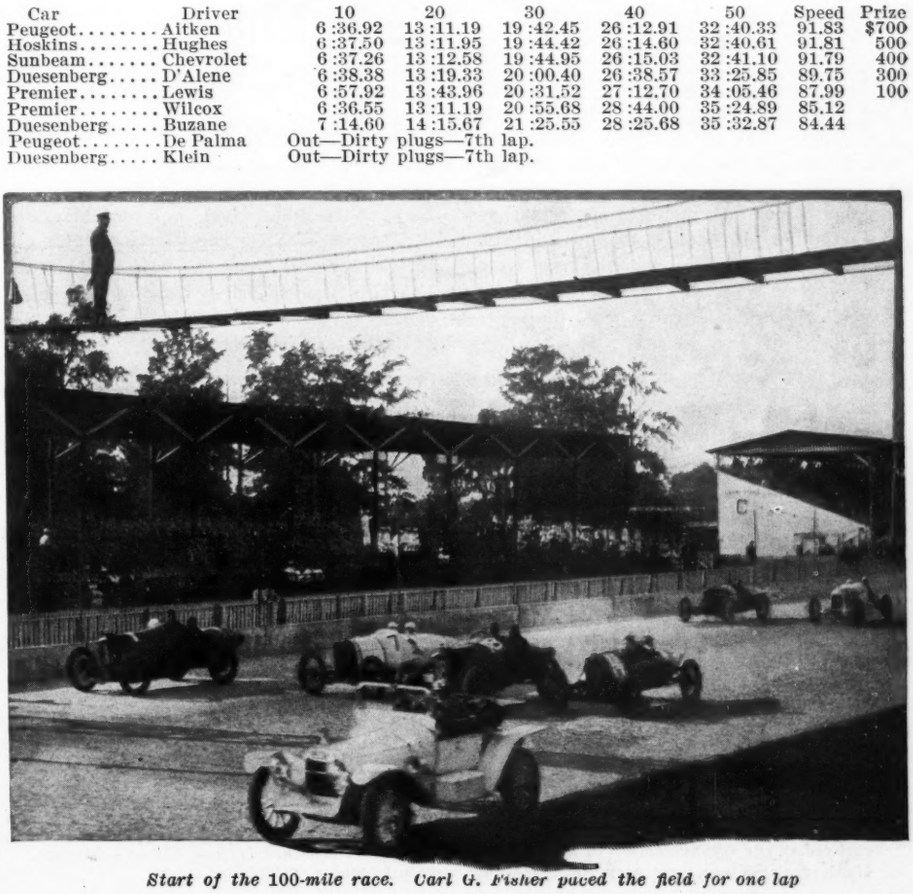
In the 50-mile dash Wilcox in a Premier led the field for six laps, then gave way to Aitken. Hughes led the field in the fifteenth lap but relinquished it to Aitken after one circuit of the track but crowded the Peugeot close and finished .27 second behind Aitken.

It was an afternoon of spectacular finishes for each race. Not more than a car length decided between first and second places in the 20- and 50-mile events and then in the 100-mile race Aitken stopped at the first pit on his last lap, coasting across the line as he got the checkered flag. Ralph de Palma, who drove Merz's Peugeot, kept running, but said after the race that the cars semed to want to climb over the outside rail all the time. It seemed odd to see de Palma in the Peugeot blue; it made one lonesome for the Mercedes, which was too badly broken at Cincinnati last Monday to participate here. Christiaens did not start, his Sunbeam having broken the crankshaft in practice. All finishing inside the money made no tire changes except Lewis who put on a left rear and left front in the 100-mile race.

Tom Rooney, who was injured in the Indianapolis race last Memorial Day when his Premier overturned, watched the race from a car immediately back of Aitken's pit. It was his first day out of the hospital. He has had his left leg rebroken twice in an effort to get the bones to knit properly.

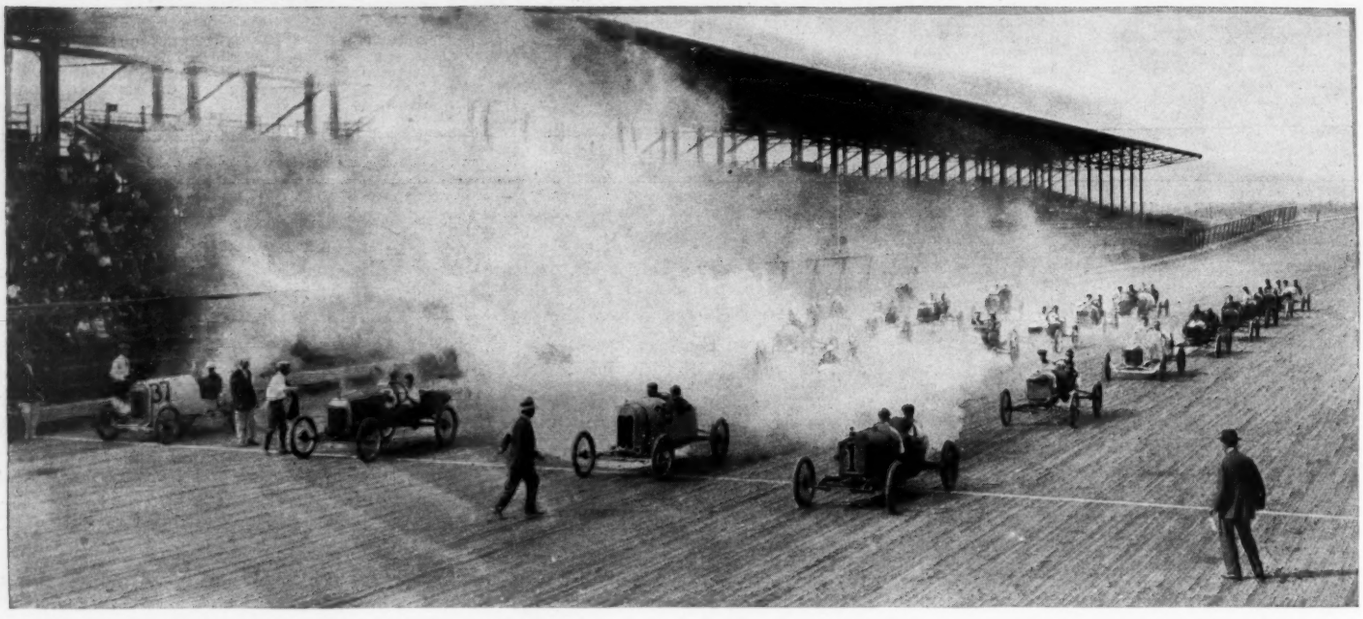
TIMES FOR 50-MILE EVENT

Car	Driver	10	20	30	40	50	Speed	Prize
Peugeot	Aitken	6 :36.92	13 :11.19	19 :42.45	26 :12.91	32 :40.33	91.83	$700
Hoskins	Hughes	6 :37.50	13 :11.95	19 :44.42	26 :14.60	32 :40.61	91.81	500
Sunbeam	Chevrolet	6 :37.26	13 :12.58	19 :44.95	26 :15.03	32 :41.10	91.79	400
Duesenberg	D'Alene	6 :38.38	13 :19.33	20 :00.40	26 :38.57	33 :25.85	89.75	300
Premier	Lewis	6 :57.92	13 :43.96	20 :31.52	27 :12.70	34 :05.46	87.99	100
Premier	Wilcox	6 :36.55	13 :11.19	20 :55.68	28 :44.00	35 :24.89	85.12	
Duesenberg	Buzane	7 :14.60	14 :15.67	21 :25.55	28 :25.68	35 :32.87	84.44	
Peugeot	De Palma	Out—Dirty plugs—7th lap.						
Duesenberg	Klein	Out—Dirty plugs—7th lap.						



Start of the 100-mile race. Carl G. Fisher paced the field for one lap

Ford Racers Set Mile-a-Minute Pace

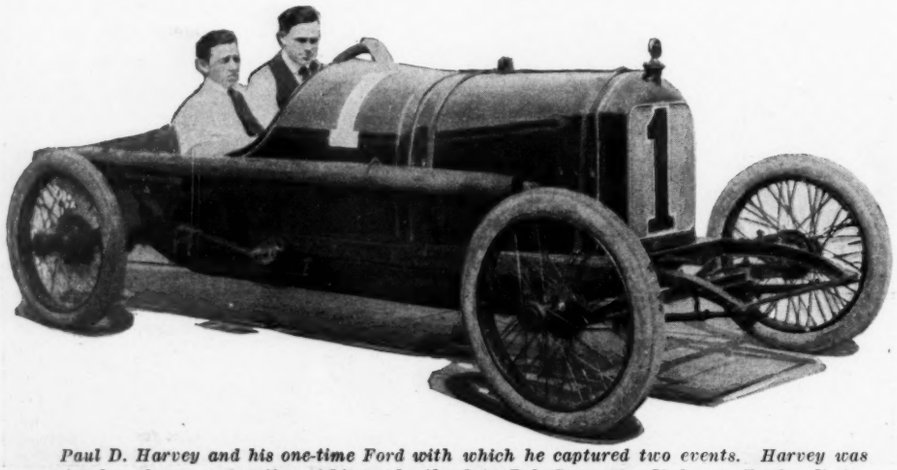


Twenty-two Ford racers line up for start of 50-mile Interstate Ford Championship—the cloud of smoke cleared after the start

Forty Contestants at Chicago in First Run Ever Held on an American Speedway for One Make of Car—Suburbanite Protege of Burman Wins at 62.5 Miles per Hour

By Darwin S. Hatch

CHICAGO SPEEDWAY, Sept. 10—Rebuilt Fords that looked like Fords and others that gave no inkling of their origin opened the eyes of between 8,000 and 10,000 spectators today as to what the popular car can be made to show in speed and stamina—if enough money and time be spent on them. It was the first motor car race ever held on any American speedway in which the entrants were limited to one make of car, and the first on any speedway in which the entrants were limited to Fords. Brooklands has had small races limited to the products of one factory, it is understood, and on American dirt tracks, amateur races have been staged in which Fords were the only contestants, but this was the first time an American speedway has been devoted to a matinee of amateur Ford races.



Paul D. Harvey and his one-time Ford with which he captured two events. Harvey was assisted in the reconstruction of his car by the late Bob Burman. It has a Ford cylinder block, transmission and rear axle. It cost nearly $1,800

Consequently, today's races aroused general speculation among race followers as to whether such a race, with between twenty and thirty starters could be staged on a fast speedway without accident, whether sufficient interest could be aroused to make it profitable and last, but not least, what speed could be made.

In all three races which formed the day's program, speeds of better than a mile a minute were averaged. There was no accident of any kind, and only once a suggestion of a contretemps near enough an accident to give the grandstands the morbid thrill they are supposed to crave. As for the interest, the grandstands exhibited more real enthusiasm in a brush between two Fords than has been the rule recently in the races on the big time for championship events.

The spectators that filled a part of the grandstands and the major portion of the parking spaces formed a different crowd from that which witnessed the championship events. It was not a society event this time. Popular prices were in order. Nevertheless, there were as many expensive cars parked around the course as ordinarily is found at one of the major events on the speedways.

The speed seemed to surprise the spec-

tators. They expected perhaps a maximum of 40 miles per hour. They saw 20 miles run at an average of 62.83 miles per hour, 30 miles at 60.4 and 50 miles at 62.5 miles per hour, first honors in the former and latter going to Paul D. Harvey, Oak Park, Ill., whose car carried No. 1, and bore a striking resemblance to Dario Resta's blue Peugeot. Just to show that his car had some reserve speed, Harvey did a lap in the 50-mile event in 1 minute and 35 seconds, or at the rate of 72.5 miles per hour. This came immediately after he lost the lead at the end of 38 miles through a stop at the pits to change a spark plug.

Harvey's car was only partially a Ford. Bob Burman and Jack Gable, Bob's mechanic, used the Harvey garage in Oak Park when entered in local speedway events and young Harvey had their assistance in designing his mount.

Details of First Race

The first race of the afternoon was 20 miles for the Chicago championship, only cars from Chicago and Cook county being eligible to start. Harvey took the lead, having the pole at the start, and kept it throughout the ten laps. V. W. Jury's car, No. 3, seemed likely to give Harvey a hard battle, but it skidded and turned completely around on the second lap, losing considerable time. When Jury got started again the leaders were more than a lap ahead of him and in wearing down this lead he turned a lap at 69 miles an hour and by fast driving brought his car into third place for the finish, Laznasky taking second. This was the only suggestion of accident during the day.

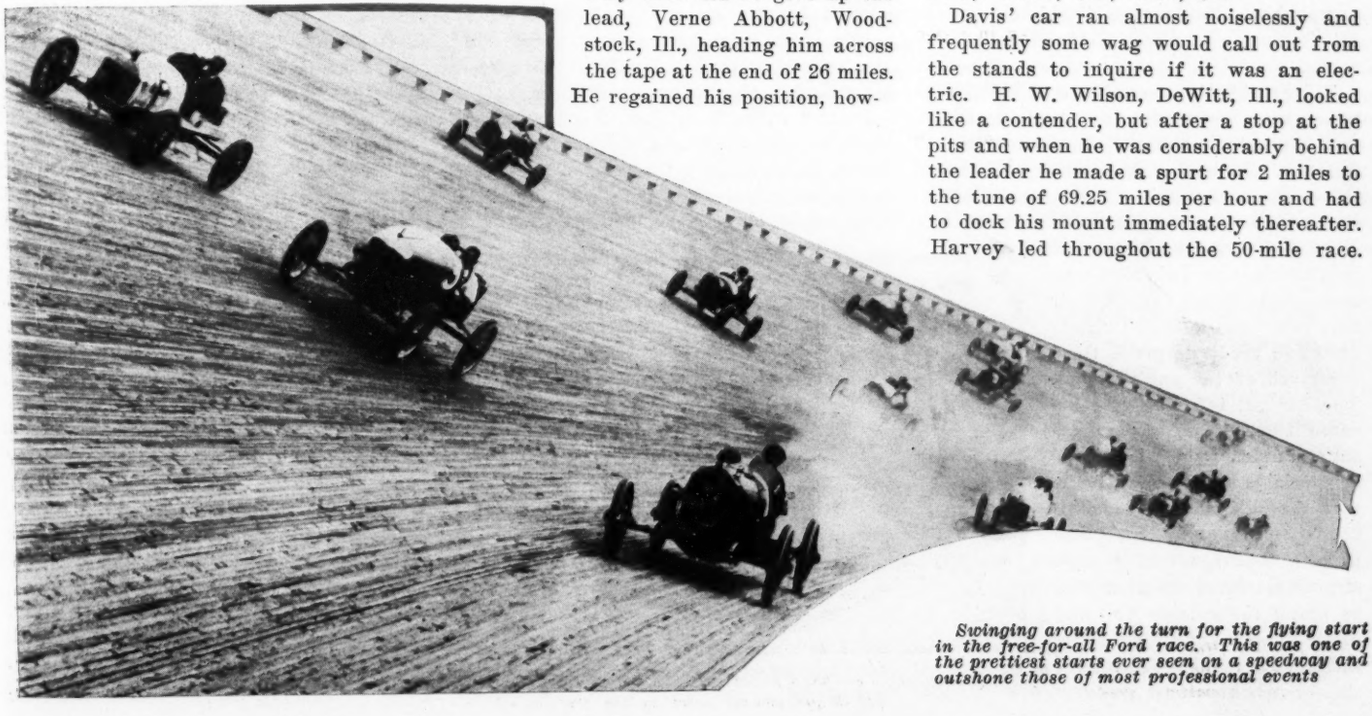
Harvey's time for the 20 miles was 19 minutes and 6 seconds, and his average speed, 62.83 miles per hour. Laznasky's time was 19 minutes, 12.4 seconds; speed, 62.49. Jury finished in 19 minutes and 41.4 seconds, his average being 60.7 miles per hour. H. A. Wolf, Desplaines, Ill., was fourth in 20 minutes and 44.2 seconds; speed, 57.87 miles per hour. The others were flagged. Harvey won $125; Laznasky, $75 and Jury, $35.

Ford racers at the pits prior to brake test

Down Stater Wins

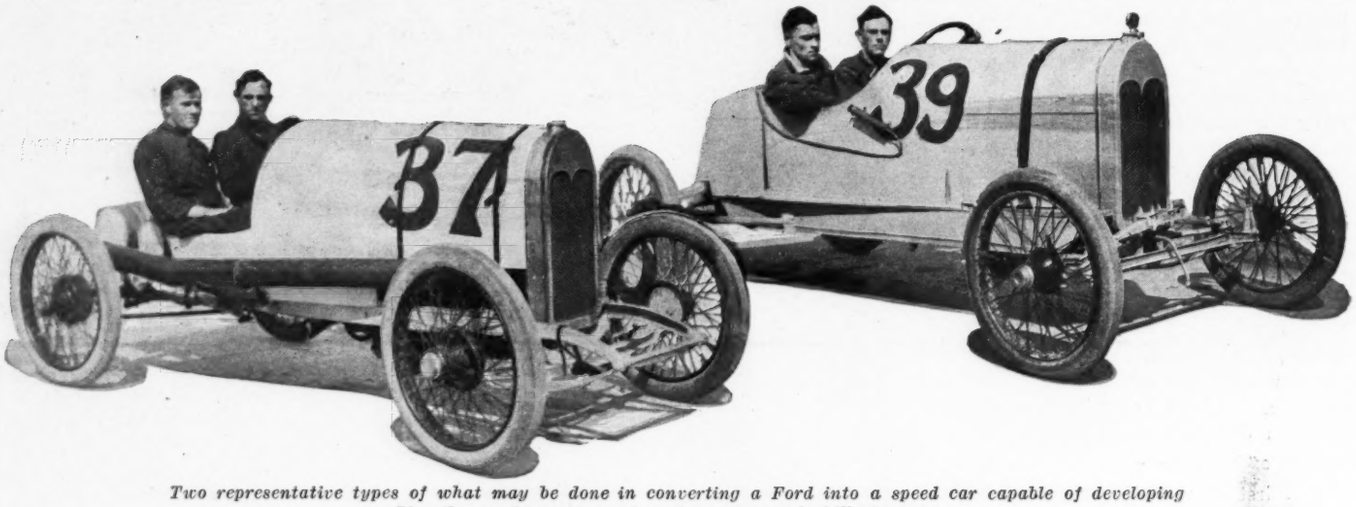
The second race of the afternoon was for the Illinois state championship, limited to Illinois entries only, and was 30 miles. Eight cars started and stellar honors went to B. F. Davis, Paris, Ill., who turned the fifteen laps in 29 minutes, 47.3 seconds, his average being 60.4 miles per hour. Only once did he give up the lead, Verne Abbott, Woodstock, Ill., heading him across the tape at the end of 26 miles. He regained his position, however, before the next lap was completed, and finished 6.3 seconds ahead of Abbott. His total time was 29 minutes, 53.6 seconds, an average of 60.2 miles per hour. Third place went to P. F. Walter, Merrillville, Ind., in 32 minutes and 36 seconds, a speed of 55 miles per hour. Just how Walter came to start in this race is a question that may be protested. The race was for Illinois entries only and Walter is a Hoosier. Fourth position was won by Clarence Shurburne, Woodstock, Ill., in 34 minutes and 25.2 seconds; speed, 51 miles per hour. The prizes in this event were: First, $125; second, $75; third, $50.

Davis' car ran almost noiselessly and frequently some wag would call out from the stands to inquire if it was an electric. H. W. Wilson, DeWitt, Ill., looked like a contender, but after a stop at the pits and when he was considerably behind the leader he made a spurt for 2 miles to the tune of 69.25 miles per hour and had to dock his mount immediately thereafter. Harvey led throughout the 50-mile race.



Swinging around the turn for the flying start in the free-for-all Ford race. This was one of the prettiest starts ever seen on a speedway and outshone those of most professional events

How They Did It



Two representative types of what may be done in converting a Ford into a speed car capable of developing 70 miles an hour, if one has the money and skill necessary

All Manner of Devices Locked Hands with Ingenuity in Making Fords Fast

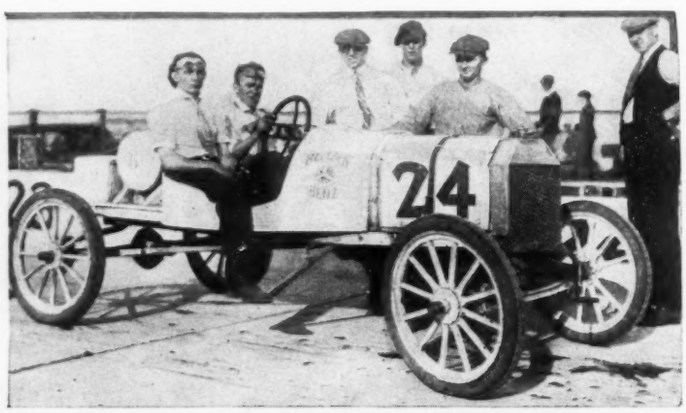
By Wallace B. Blood

CHICAGO SPEEDWAY, Sept. 10—Hay wire, binding twine, trunk straps, junk parts and mechanical ingenuity, combined with more or less semblances of Ford cars, went to make up the creations which took part in the Ford race today, and a more motley assortment of reconstructed flivvers has never been seen. The springs were underslung and overslung—two cars were entirely without springs. There were distributors, special magnetos and ordinary Ford magnetos, cast-iron pistons and aluminum pistons, skeleton bodies and streamline racing types. Even that which was previously considered impossible was accomplished. Fords were disguised so that all evidences of their birthright was effaced.

The greatest interest hinged on car No. 1 which took first money in two of the races and showed close to 80 miles an hour in practice. It is a Bob Burman and Jack Gable-designed replica of a Peugeot, built in his father's garage at Oak Park, Ill., by Paul Harvey, the driver. It was this garage in which Burman and Gable kept their cars prior to the 1915 Chicago race and credit is given them for much of the car's design. The car got into the race because it has a Ford block, gearset and axle. Otherwise it was a special racing job all the way through. A sum amounting to well over $1,500 is said to have been spent on its construction. More credit should be given the entries who had limited capital and spent their sums on alterations which gave their Fords the most speed.

Harvey's car was a masterpiece of workmanship and is prophetic of what may come in cars with small motors capable of attaining high speeds. In action it was like a Shubert symphony, smooth and harmonious. The block bore the Ford stamp. Internally, however, the motor had more bore and stroke, larger valves, racing camshaft—in fact, is so altered that there was little Ford left. The frame is hung low on heavy cantilevers. The exhaust is carried out through four straight pipes into an exhaust tube on the side which is large enough to take care of a 300-cubic-inch motor. The magneto is Bosch, there is a Master carbureter, Rudge Whitworth racing wheels and Goodyear cord tires.

In the writer's opinion the car which bore No. 37, built and driven by B. F. Davis, Paris, Ill., was the meat of the meet and is a typical representative of how a Ford motor may be coupled with hybrid parts to make a car which is capable of close onto 70 miles per hour. Davis won the 30-mile Illinois state championship, but unfortunately broke a rod in the free-for-all when he was running close second to Harvey.



Lasnasky's so-called Blitzen Benz was a Ford true and simple, yet it got second place in the free-for-all

The motor is Ford. The bore is the same and the stroke. Valves were enlarged to 1⅝ inches, Rich tungstens being used. The carbureter is a Master and magneto a Bosch. The camshaft was not altered. A Monroe frame is used to undersling a Scripps-Booth axle on the front and a combination Ford and Scripps-Booth axle on the rear. This combination includes a Ford differential and housing with Scripps-Booth floating axle. The high Champion radiator and formidable-looking streamline body gave the car a full fledged racing appearance.

Another car of similar lines was No. 39, built by H. B. Wilson, Dewitt, Ill. Mechanical trouble made it a poor contender in the races, but in preliminary trials it showed commendable speed. Here, too, a Champion radiator heads a symmetrical streamline body. Bosch and Master equipment is evident and Universal Welding Co. wire wheels are fitted. The builder ground his camshaft to quicken the lift and drop, and installed lynite pistons.

The most varied of all alterations were the methods of lowering the frame. Car No. 38, Chic Wheeler, Des Plaines, Ill., lowered the front with a special axle as shown in Fig. 1. In the rear, Fig. 2, he sawed off 4 inches from the

frame on each side and suspended the regular Ford rear-spring hanger on two goosenecks made out of flat bar steel. This gave him a frame 4 inches lower than is found in the stock Ford. He also uses Bosch for ignition and the carbureter is a Rayfield.

Another unique method of lowering the frame was found in car No. 10, driven by Hugo Zeeh, Oak Park, Ill. As shown in Fig. 3, the front axle was underslung by the use of a U-shaped piece of flat steel stock over the axle and fastened to the springs with clips as shown. In the rear, he utilized the brake arm studs in the axle hub to fasten a forked bar from the axle to the frame as shown in Fig. 4. About 2 inches forward from the fork he bolted shackles and suspended the transverse spring from these. These alterations gave him about 4 inches drop.

Beauty Only Skin Deep

Car No. 6, which finished third in the free-for-all, certainly performed differently from what it looked. It was an old Ford in the first place, and had seen much service. There was nothing much special about it except that the axle was geared up and the timing set ahead. Underneath the gearset was a battered sheet metal pan, "to keep the oil from the track," according to Henry Mueller, Chicago, the driver and owner. This pan was fastened to the frame with hay wire—all-in-all a crude-looking job. But the car had the stuff and the prize won certainly bought that battered pan and the hay wire.

Car No. 3, V. W. Jury, Chicago, promised to be a strong contender. One little oversight put it in the discard and that was that the driver relied on hood fasterners instead of a strap. He made four stops in the 50-mile event to fasten down the hood and finally secured it in place with a dose of the ever-present hay wire.

Car No. 24, driven by Emil Laznasky, Mt. Prospect, Ill., which got second place in the big race, had about as little done to it to make it fast as any of the contenders who placed. The driver, who was also the builder, against the advice of friends removed the magnets from the flywheel of the Ford motor and installed an Atwater-Kent distributing system. He attributes his success to this disregard of his friends' advice. About the only other change from a regular Ford was the use of a Master carbureter and a V-shaped tank soldered on to the front of the radiator to give additional water capacity.

A majority of the cars in the race were provided with some kind of an extra carrying space for water. There were tanks soldered on the front and rear, of all shapes and degrees of beauty.

What few there were who did not alter the radiators were frequent visitors to the pits for new water supply.

Car No. 40 was entered by J. W. Duntley, originator of the Chicago Pneumatic Tool Co. and a well-known inventor. It embodied his latest invention, a kerosene burning atomizer. The device will start a Ford cold on the second or third turn of the crank. It weighs but 1¼ pounds. There are sixteen parts which go to make up the complete device. Kerosene is admitted to the atomizer into an ordinary float chamber, but that is all of the device which resembles a carbureter. The fuel is sucked into a tube in which there are a series of slits for atomizing. Over this tube is another sleeve with more slits. Mixture is made rich or lean by matching up the slits, few for a lean mixture and all of them for a real rich mixture. This operation is controlled by a lever on the steering column. The throttle is a dished disk which slides over the outside sleeve thus regulating the amount of fuel admitted to the motor. The car entered the race on three-quarters kerosene and one-quarter gasoline, but the atomizer will handle straight kerosene with good results. Duntley offered $200 for any other keresone-burning Ford which would race him, but did not get an acceptance.

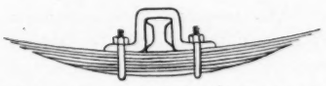


Fig. 1—One of the simple methods used to undersling Ford front springs

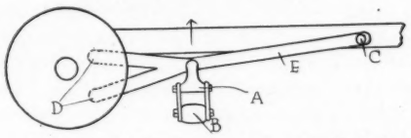


Fig. 2—Underslung rear spring. Forked rod E was anchored at the brake rods D and at the frame at C. Spring B was shackled to the rod by A

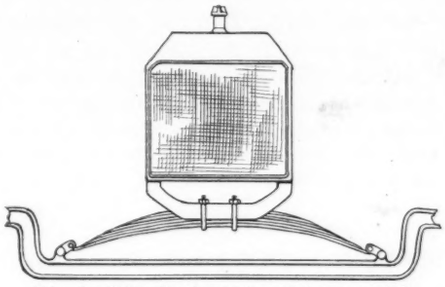


Fig. 3—This Ford front axle is a special forging with dropped ends

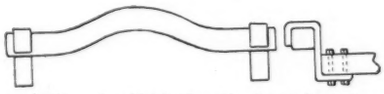
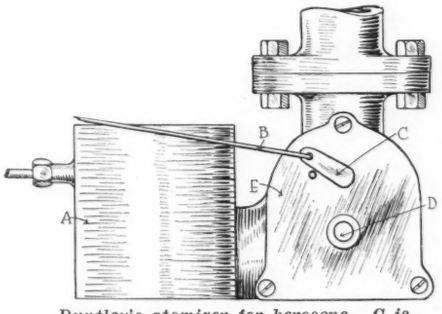


Fig. 4—Method of lowering rear spring 4 inches. The end of the panel was cut off and a gooseneck fitted as shown



Duntley's atomizer for kerosene. C is the mixture-control lever, B the mixture-control rod, D the throttle, E the cover plate and A the float chamber

As a summary, speed seemed to have been attained by the use of special magnetos or distributers, carbureters of larger capacity than the Ford, lowered frames, higher gear ratios, and timing set ahead, with a few of the camshafts special and some of them ground to sharper points by the builders. There was not a car in which attempts had been made to increase the compression by reducing the combustion space. Cast-iron pistons seemed to have held their own against alloy ones. Tire trouble was not in evidence. Of course, every car had higher gearing. The ratio was from 2¾ to 1 to 3 to 1, using stock Ford gears of these higher ratios.

Amateurs Show Driving Skill

With over twenty cars, all manned by amateurs most of whom had never been on a speedway before, circling the track twenty-five times without an accident worthy of mention was remarkable. The officials of the race were worried. They admitted it. At the drivers' meeting, which was held shortly before the race, Starter R. R. Duff emphatically laid down the driving rules which were lived up to by most of the drivers in a masterly fashion.

The pits were handled in a manner somewhat different than in professional races. If a car slid over its pit, no matter how small the distance, it had to be driven around the course again. There was no backing up. In the first two races, only the cars in that race could stay in front of a pit. The others were dispatched to their garages. In all three races, any car which cuckooed was promptly driven off or pushed off of the course. This left a clear path for the inexperienced drivers who swung into the pits.

The drivers were cautioned against driving high on the turns, Limberg's accident in New York being cited as an example of the possible results of such tactics. The mechanicians were instructed to look back constantly, with the possibility of disqualification of the car if they failed to do so.

It is an indication that amateur events with many cars entered may be as safe as professional races. The drivers were rookies at the game and all willing to admit it, and to follow instructions.

VAIL TRACTOR PLANT BUILDING

Hamilton, O., Sept. 9—The Vail-Rentschler Tractor Co. now is being organized here with an authorized capital of $100,000 to build and market a medium-weight tractor which will operate with either gasoline or kerosene.

The Vail tractor, which will be manufactured by this company as a specialty, has been thoroughly tested and perfected by men who have been intimately connected with the manufacture and sale of farm tractors for several years. A plant is now being equipped opposite the Butler County Fair Grounds in Hamilton.

De Palma to Build Cars

Popular Italian Driver Said to Be Planning Construction of Racers

Ralph and His Backer, Frank Book, Form Company at Detroit

DETROIT, Mich., Sept. 11—Ralph de Palma is going to manufacture racing cars, according to an announcement made here today. He and his backer, Frank Book, a local millionaire, have acquired a factory building on East Woodbridge street which will be utilized for the manufacture of racing machines under the direction of de Palma. The price paid for the factory is reported to be $23,000.

Whether or not this means that Ralph is planning to forsake the Mercedes next year for something faster it is impossible to learn as yet. Much interest has been aroused by the Packard twelve-cylinder racing cars and comment has been heard that Ralph would drive one of them when they had been brought to a point where the Packard company wanted to put them in competition. It now looks as if Ralph may tool some new mount next year.

DENVER-COLORADO SPRINGS MARK

Denver, Colo., Sept. 9—A new road record between Denver and Colorado Springs was set today by Harold Brinker in a Cadillac eight, making the 74.7 miles in 1 hour, 12 minutes, 38 seconds, and cutting 9½ minutes from Ralph Mulford's recent record of 1 hour, 22 minutes and 25 seconds made over the same course in a Hudson Super Six. The new record is the fourth attempt in the last 10 days to lower the time between the Colorado cities. The other three failed on account of a thrown wheel in one instance and blowouts and other causes in the other two trials. The road was patrolled by flagmen from the Cadillac agencies in Denver and Colorado Springs.

Brinker holds the record between Denver and Pueblo of 2 hours and 15 minutes for the distance of 119 miles and record of 45 minutes between Colorado Springs and Pueblo, a distance of 44 miles. He finished fourth in the trophy event at the Pike's Peak hill climb.

PARSONS RETIRES FROM RACING

Tacoma, Wash., Sept. 9—Jim Parsons, who has been driving racing cars in the Northwest for the last 4 years, has announced his retirement from racing, on account of taking the state agency for the Stutz line, and his famous old No. 8, formerly a winner for Earl Cooper, is now for sale.

BURMAN'S BROTHER FOR VANDERBILT

Santa Monica, Cal., Sept. 9—That the name of Burman is to be perpetuated in the annals of motor racing is indicated from the announcement made recently that Earl Burman, the younger brother of Wild Bob, who rode to his death in the Corona road race last April, is building a car to be entered in the Vanderbilt cup and Grand prize races here in November.

OFF AGAIN, ON AGAIN, GONE ——

Providence, R. I., Sept. 11—The race scheduled for September 16 on the Narragansett Motor Speedway here, again has been called off, this time apparently finally, according to the A. A. A. contest board. This race was originally set for September 16, then cancelled, and afterward reinstated and entries were being sought as recently as a week ago by F. H. Perkins, who has promoted the contests on the Providence track in former years.

Gotham Race 250 Miles

Shortening It 100 Miles to Bring More Patrons, Officials Believe

Internal Troubles no Longer Stand in Way of Holding Event

NEW YORK, Sept. 8—The Astor cup race will be held on the 2-mile Sheepshead Bay speedway here Saturday, September 30. The race will be for 250 miles instead of 350 as last year. The shorter distance has been selected to increase the popularity of the event. With 250 miles it will be possible to start the race at 2:30 p. m., thus giving all Saturday afternoon holiday people an opportunity of witnessing the start and the entire race.

The prizes total $25,000 or at the rate of $100 per mile. This is divided as follows:

First prize	$10,000
Second prize	5,000
Third prize	2,500
Fourth prize	1,600
Fifth prize	1,300
Sixth prize	1,200
Seventh prize	1,000
Eighth prize	900
Ninth prize	800
Tenth prize	700

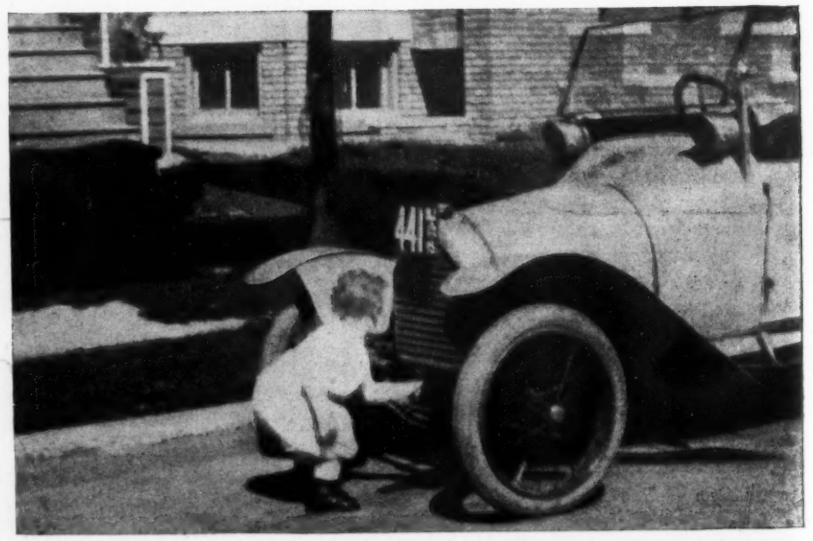
For a time there has been some question as to whether this race would be held or not because of certain internal troubles with the track organization. These were all clarified at a meeting yesterday when complete arrangements for the race were perfected.

IMPROVING S. A. TRADE RELATIONS

Buenos Aires, Aug. 6—Motor car concerns doing business in Argentine, can be greatly assisted by the American Commer-

LIKE FATHER LIKE SON

Ralph K. Mulford, Jr., tries his hand at spinning the motor of a baby Peugeot, a small edition of the same make of car which his father pilots on the speedways. The manly pose shows close study on the part of the youth of the ways of his father. The squat is for a quick getaway should the motor—by chance—start.



cial Club, an organization of U. S. A. business men in this city. This commercial club has as its object the improving of trade relations with the United States of America. Recently this club has associated itself with the United States Chamber of Commerce, Washington, D. C., and has established itself as a clearing house for information of U. S. A. manufacturers of all kinds.

In addition to being prepared to give any U. S. A. manufacturers information regarding any conditions in Argentine, the American Commercial Club is playing the role of an arbitration board for the purpose of adjusting complaints made by Argentine merchants against firms in the United States. These complaints are often due to delayed shipments, goods not corresponding with samples, etc. In a word, this club is endeavoring to facilitate and improve the commerce between the two countries, all of which is highly necessary if the U. S. A. is to secure that control of the Argentine trade which it should.

Expense a Factor

In carrying on this work the American Commercial Club is put to considerable expense, the cost being approximately $10,000 a year. The business merchants here, who are members of the club, are willing to give their time and some of their money for the purpose of carrying on this work, but cannot meet the entire financial responsibility. U. S. A. motor vehicle manufacturers who are now intensely interested in Argentine, can assist by subscriptions of $25 per year, or higher. It is possible to obtain membership in the chamber for a nominal sum, and thus get advantage of all information collected by it. The officers of the club are all U. S. A. people, and hold responsible positions in the city.

The officers and directors are: President, J. L. Wheatley; vice-president, Louis C. Young; honorary secretary, Alfred Eichler; treasurer, A. T. Brooks; and governors, H. E. Finney, W. J. Pilant and S. D. Allchin. Mr. Finney is manager of the Armour meat packing industry, which has the most modern slaughter-house in the world; and Mr. Pilant is manager of the International Harvester interests for Argentine, Chile, Brazil, Uruguay, and other parts of South America. The club is located in the Plaza Hotel, Buenos Aires.

PREMIER SIZE MISSTATED

The aluminum motor of the new Premier car is 3⅜ inches in bore and not 2⅜ inches as stated in the description of these cars in Motor Age issue of August 31. Through a like typographical error, Chief Engineer Gunn's name was given as Earl G. Dunn.

ST. LOUIS SHOW DATE SET

St. Louis, Mo., Sept. 11—The Automobile Manufacturers and Dealers' Association of St. Louis, announces that the motor show will be given the third week in February, place yet to be announced.

Road Engineer's Worth

Missouri Supreme Court Fixes Salary at $100 a Month and Holds Up Work

Motor Club Seeking Way to Pay Expert $400 Monthly

ST. LOUIS, Mo., Aug. 21—Members of the Automobile Club of St. Louis are seeking a way by which James C. Travilla, former street commissioner of St. Louis, can be employed legally as superintending engineer of the road improvements made possible in St. Louis County by the $3,000,000 bond issue recently voted. Mr. Travilla was engaged at $400 a month, but in testing the legality of the bonds, the supreme court held that no engineers could be employed at more than $100 a month and Mr. Travilla resigned, making a report so that the work he had done would be on record.

Mr. Travilla, it will be recalled, gained a national reputation by designing a system of utility roads for Tarrant County, Tex., which made a transportation wheel out of the county with Fort Worth as the hub. The treatment in St. Louis is different because of the lay of the land and interests, but Mr. Travilla thinks by a system of five loops connected by cross-roads and designed in keeping with the St. Louis city boulevard system he can combine pleasure and commercial driving.

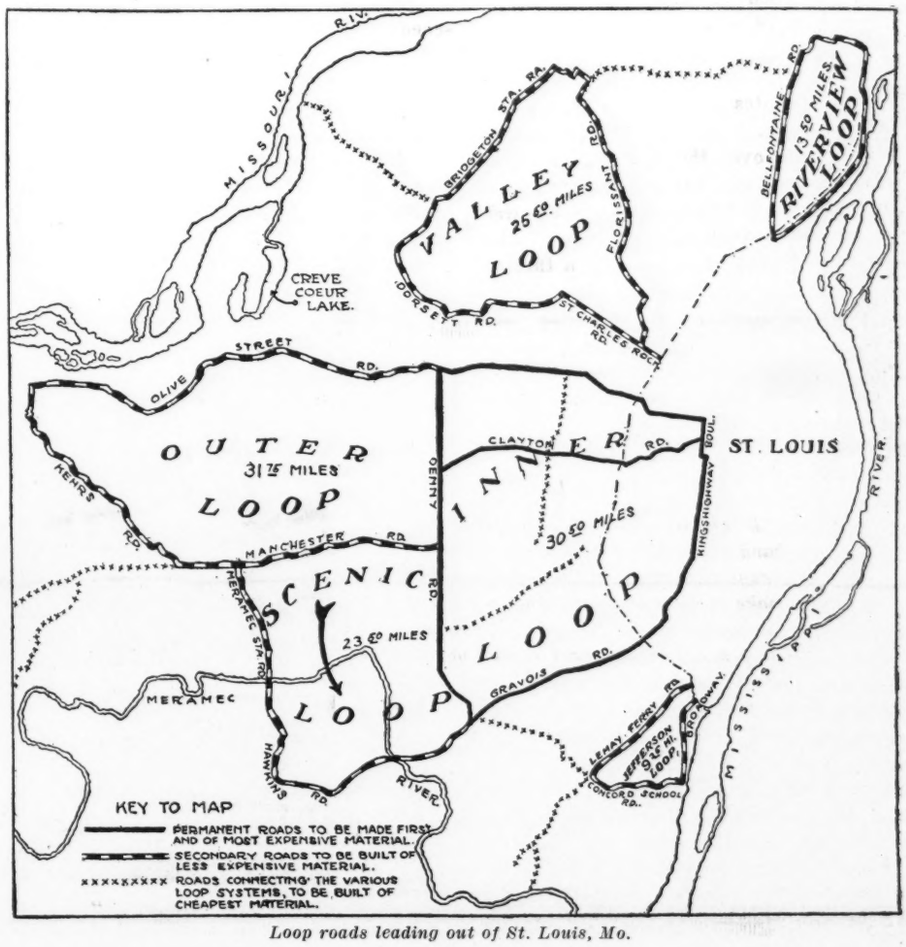
The aggregate length of the proposed highways is 184¾ miles. Mr. Travilla considered that of the $3,000,000, $2,790,000 would be available for road improvement work, 5 per cent going for engineering cost, right of way, moving fences, widening bridges, and so on.

GAS PRICE REDUCTION GENERAL

Chicago, Sept. 8—Yesterday's reduction of 1 cent in the price of gasoline by the the Standard Oil Co. of Indiana has been met throughout this territory by the Texas Co. and other independent oil concerns by making the Chicago tank wagon basis 16½ cents a gallon.

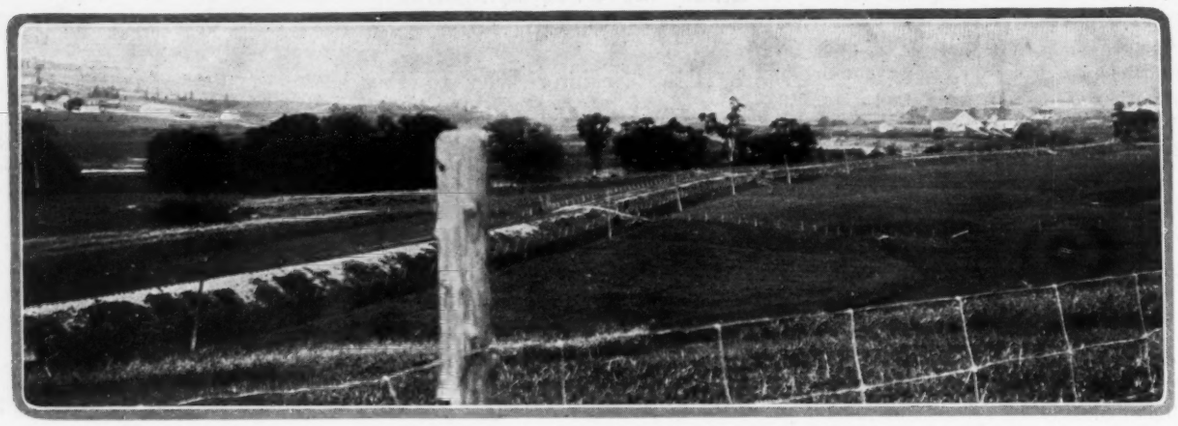
Reports from Kansas City, Mo., say Standard oil reduced 1 cents to 15⅝ cents on the tank wagon basis and the independents have cut the prices 1 cent to 16.8 cents. In St. Louis the new price is 15.9 cents for Standard Oil product, and in the Twin Cities it is 17½ cents. At Detroit the filling station price is 17 cents at any of the Standard's forty filling stations, but so far the independents have not met the reduction.

In Milwaukee Red Crown gasoline at the filling station or tank wagon basis is now 16.6 cents per gallon, a 1 cent reduction. The independents are asking 17.6 cents at the filling station and 16.6 for tank wagon delivery.



Loop roads leading out of St. Louis, Mo.

New England-Canadian Tour



The plateau south from Quebec, on the south side of the St. Lawrence, is a rich agricultural country and you travel over 75 miles of fine macadam road as smooth as a billiard table. The road is now being finished so as to connect with the highway system of Maine

EDITOR'S NOTE—H. M. Swetland, president of the Class Journal Co., publisher of Motor Age, is one of the old-time motor tourists whose experiences date to the early days of steam vehicles. Every year Mr. Swetland takes two or three 10-day motor trips. He considers them the greatest means of vacation available. He has followed this policy for years but this is the first time he has consented to tell in his own way the pleasure that the busy business man gets from 10 days' motoring through the country with three or four of his fellow business men. Mr. Swetland selected the tour from New York by way of Montreal, Quebec, and the Maine woods as offering one of the greatest opportunities for recreational motoring.

By H. M. Swetland

NEW YORK, Engineers' Club, Aug. 18—Off for a week and 1,400 miles on nature's movies on one of the finest, most pleasant and most picturesque motor trips on the American continent, is the keenest anticipation one can desire.

Promptly three of us and a driver rolled up Fifth avenue, crossed Central park, saluted Grant's Tomb, kissed the Hudson good-bye, awoke the echoes of Sleepy Hollow, skirted the shores of the reservoir lakes, and were clamoring for breakfast at Lake Mahopac before the dining room doors were open. This insistence for food on the part of Barnett—hereafter called Frank—disturbed the star boarder to inform him that he—Frank—did not own the hotel. Frank subsided, but a shining piece of "siller" on the part of Hopkins—hereafter called Hop—purchased relief, and at 8 o'clock we were again winding in and out among the mountains and lakes, passed Pawling, from which we plunged boldly into the Berkshires. Having no cards of invitation from the millionaire residents of Stockbridge and Lenox, we passed through Pittsford and enjoyed our lunch in the shadows of Williamstown college in Williamstown, 166 miles from New York.

Scenery of the Finest

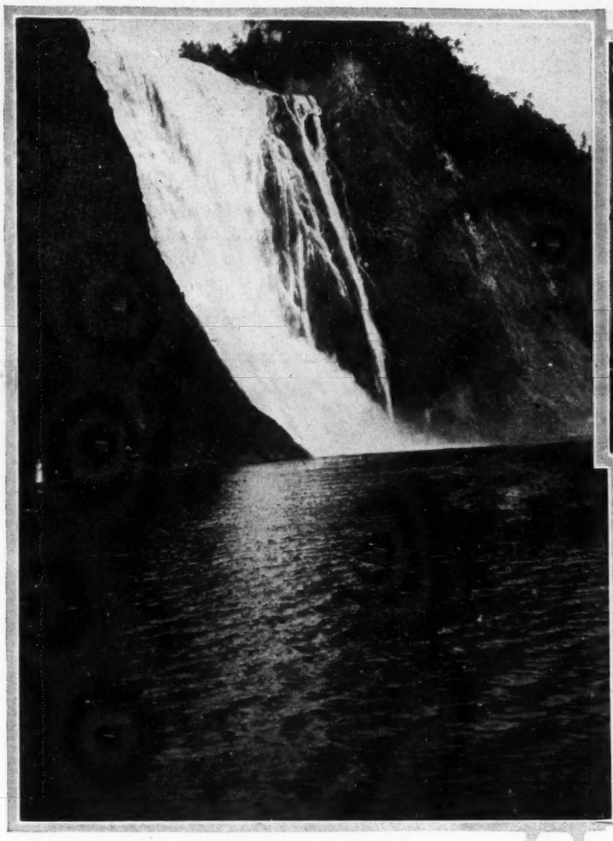
The scenery through this section is beyond description. It is a continuation of mountains and quiet farms and sunshine which brings rest and contentment at every point. The road was perfect, and at 3:30 we were telephoning our host from Rutland, Vt., that we would arrive at his place at 5 o'clock.

From Pittsford we made a straight run to the east up into the mountains where we were to spend the night with the one and only Mathewson, whose first name is Brockholust — hereafter called Brock — of Motor Print fame, who spends his spare time and money on his farm in the Green mountains, Vermont.

The First Control

Whatever of fresh vegetables, corn and eatables in general, are not produced on this farm we do not know. Suffice it to say that we gorged ourselves on fresh milk and cream, meats, vegetables and desserts, and at 7 o'clock we were on the veranda overlooking the beautiful view to the west, watching the sun drop behind Ticonderoga and Lake Champlain. It was while seated on this veranda that Hop broke into song—at least, that is what he called it, and this with numerous and strictly original accompaniments, with choruses joined in by the party and family filled in the time till the candles were lighted. Fortunately,

From Bethel to Gorham along the Androscoggin is one of the finest motor rides of the trip. You are skimming over an excellent macadam surface and the road winds along the river

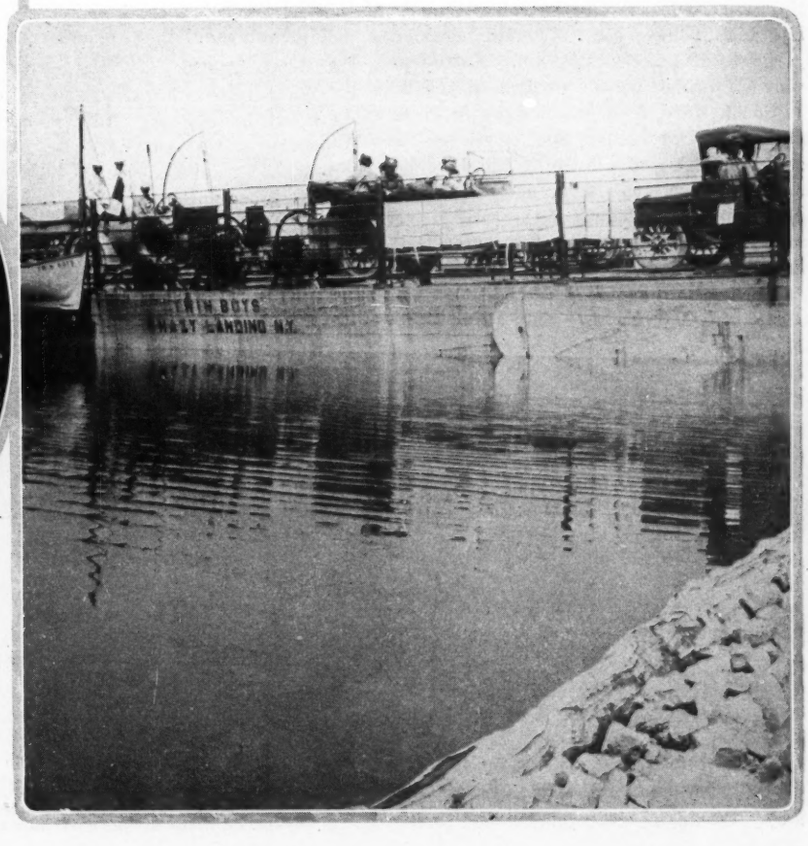


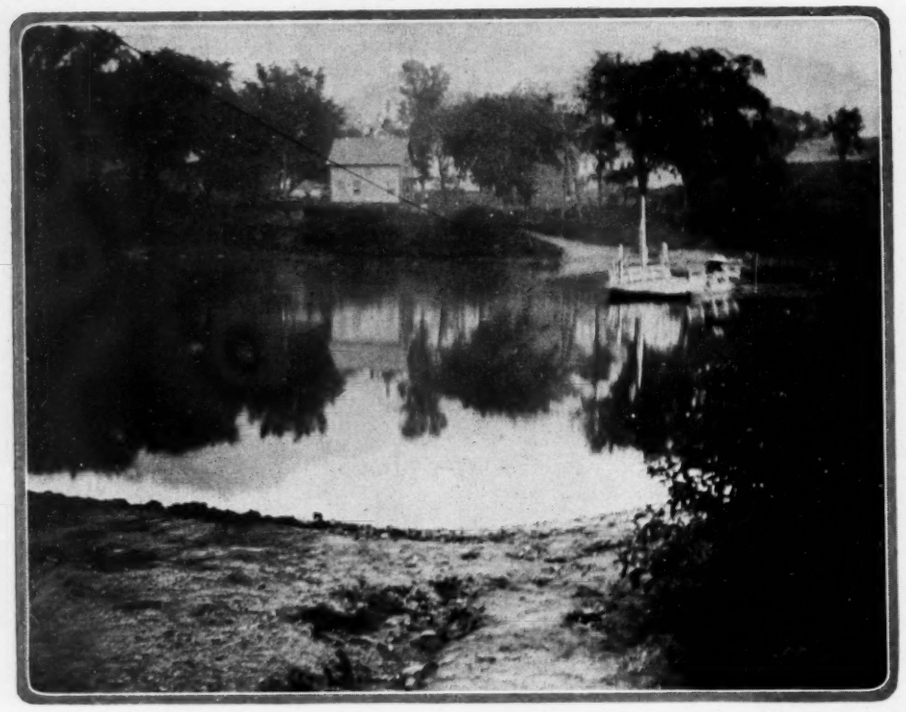
The Falls of Montmorency are above 15 miles from Quebec on the Montmorency River where it flows into the St. Lawrence. Any trip through this country would lose part of its restful charm if a few minutes were not spent in this spot

Above—The northern boundary of Maine and the southern boundary of the Province of Quebec. There is no village at this point on the international boundary line but a small hotel and a still smaller custom house. In oval—The small custom house on the International boundary between Quebec and Maine

Below—The Chazy Ferry makes a half mile trip across the Northern arm of Lake Champlain between North Hero Island in the lake and the mainland of New York state

The Mathewson farm in Vermont is one of those typical restful vacation spots where the business man can rest his eyes overlooking vast areas of lake and rolling forest land





The current ferry is one of the ingenious ferries of New England. You use it to cross the Androscoggin at a point 5 miles east of Bethel. The ferry has accommodation for only one car. It crosses the stream by means of an aerial trolley carried on the wire overhead which is seen in the photograph. From this wire two trolley wires connect with the ferry a short one to the front end of the ferry and the longer one to the rear. The ferry has a rudder or center board which is set and against which the flow of the current is sufficient to drive the ferry slowly across the river in obedience to the trolley and the overhead wire. When making the return trip the position of the long and short trolley connections is reversed

the house is in an isolated neighborhood, and no arrests were made for disturbing the peace.

Saturday morning we glided down the mountain side from Brock's, picked up the trail at Pittsford and proceeded to Burlington, Vt., over a beautiful gravel road and high rolling country, with occasional glimpses of Lake Champlair. Nature provided a bridge across an arm of the lake to South Hero, from which another dispensation of Providence and a gravel road slightly above the level of the lake connects with North Hero, after which we placed our confidence in the Chazy ferry and were soon lunching at Rouse's Point.

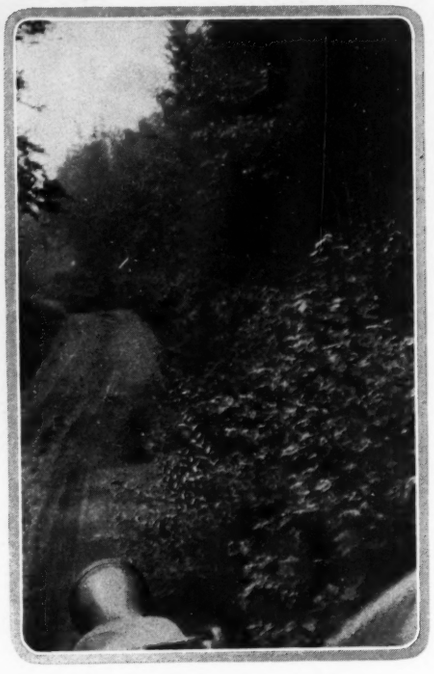
After paying our respects to the Canadian customs authorities, and signing an affidavit that we would bring the car back with us in 30 days, a few minutes brought us to King Edward highway, a straight stretch of macadam which brings you to the St. Lawrence river opposite La Chine rapids.

And now, we were entering the long iron bridge into the center of Montreal. Here we were promptly stopped by a man in the uniform of the Canadian guards, and we realized for the first time that we were in a nation where war dominates everything, $1,000,000 a day being the price paid by Canadians to assist in financing the great struggle, besides sending the best of Canada's loyal sons. After satisfying the sentry that we were real Americans, that our pockets were not full of dynamite, and that we were not intending to blow up the bridge, he allowed us to pass, arriving in Montreal just a few minutes too late to take the train to La Chine and shoot the rapids before sundown.

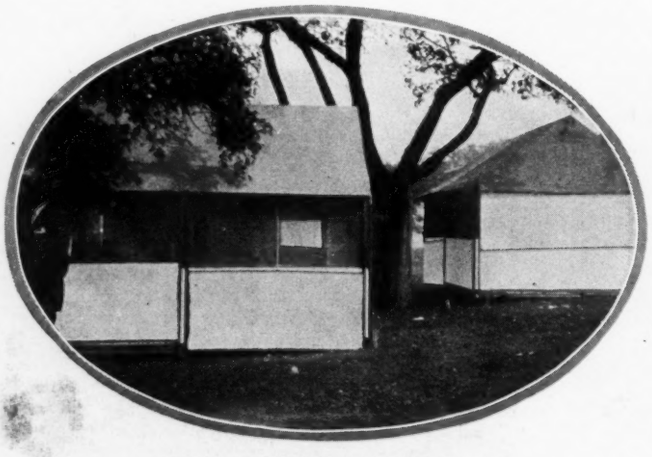
A Hot 3 Hours

We were only 3 hours in Montreal. These 3 hours have burned themselves into the memory of this party as the most uncomfortable 3 hours spent on the whole trip. The temperature was 105 in the shade, and when Montreal is hot it is very, very hot. Wishing to avoid one or two detours, made necessary by the new road being finished between Montreal and Quebec, we landed motor car and party, bag and baggage on the steamer, and at 7 o'clock were gliding down the St. Lawrence.

We arrived under the fortress of old Quebec at 7 o'clock in the morning, enjoyed our breakfast on board, rolled the Pierce up alongside on the dock, tumbled in the baggage and climbed the hill which winds in and out of old Quebec to the Chauteau Frontenac, situated immediately overlooking the river in a part of the old walled city, and immediately adjoining the fort. We had rooms facing east and west looking up and down the river, so that we could watch for German submarines in either direction, and with the fort immediately at our back we felt comparatively safe.



This is a typical view of the main woods through which you drive. There is a 14-mile stretch of this kind of road south from Moose Head section and there are hundreds of miles of similar forest roads in Maine over which the business tourist is compelled to forget the remotest symptom of business.



This is the Bethel Inn sleeping rooms which are lighted by electricity and the sides of which are screens. There is nothing more restful than a night spent in one of these unique apartments

The forenoon was spent in driving out to the Wolfe monument, viewing the old battlefield between the French and English of 1759, but we were not successful in finding the defile where Wolfe is said to have led the Britishers up to the Plains of Abraham for the great surprise. The Wolfe monument, however, occupies a conspicuous position on the plains.

After lunch we proceeded north along the St. Lawrence through the most picturesque settlement in America. Imagine a village 35 miles long, with houses every hundred feet, all

built in a simple and ancient style of architecture, whose dominating feature is a curved roof. Very soon we discovered the reason for this proximity of dwellings. Evidently the early land grants gave the owner a clear strip of land beginning at the river, and extending a long distance back into the hills. Crossing these strips at varying distances from the river is the road which presents one continuous village from Quebec to St. Anne. While the road is good the street is narrow, and is filled with all the living things that are seen anywhere, from cows to Catholic priests.

Half way we stopped to visit the beautiful Falls of Montmorency. We left the car at the road, wandering down into the park with the picnickers, entered a dilapidated incline, which undoubtedly owing to its proximity to St. Anne, carried us safely to the bottom. Here you have a wonderful view of the falls, slightly higher than Niagara and about one-quarter the volume. Instead of the water falling in an unbroken mass it slides down the side of the rock, presenting a picture of rare beauty. Obtaining a front seat in the incline again, which, by the way, was a compartment car after the truly English fashion, our compartment being reserved for smokers, and another prayer to St. Anne, we were safely landed at the top. From this a short run took us through the same picturesque village winding in and out among the ups and downs along the St. Lawrence until we arrived at the wonderful Shrine of St. Anne.

One is impressed through all this section at the wonderful work performed here by the Catholic church. Every village large or small has one or more stupendous churches seemingly larger than all the other buildings in the town added together. The Cathedral of St. Anne is a shrine to which many have journeyed for miraculous cures for all manner of diseases. The traveler is offered the evidence on the spot of hundreds of crutches tied around the base of the columns in the grand edifice, and stacked hundreds deep to the organ loft. The wonderful relic was passed while we were present through a long line of worshippers kneeling in front of the altar.

The trip back to the hotel was made through the same village, the same people, the same soldiers, all in holiday attire, all apparently having a much better time than we were, for each of us could only speak we are on the broad walk facing the river in front of the Chateau Frontenac, and as far as the lights and people and the general stir of things are concerned we may have been on the boardwalk at Atlantic City. In any case, the rooms were delightful, and after a good night's sleep, which was only disturbed by groans from Frank when he dreamed that the price of gasoline, which had already doubled, had quadrupled, under the guidance of the Blue Book we headed for the ferry to the southern side of the St. Lawrence, and were soon gliding over the famous plateau which extends southward from the St. Lawrence through many miles of fine farming land, abundant oat fields, and every now and then the village with the big church, interspersed between towns with numerous shrines, keeping the traveler constantly in mind of his moral obligations. Thus, through 75 miles, with as splendid a road as we can boast, we approach the Moose Head Lake section of Maine. Before leaving Canada we found 25 miles of road under improvement, and while fairly passable and always enjoyable, it kept us down to a speed which allowed us to observe the scenery.

To make sure that we were crossing the line into the United States, we visited the monument which, for some unknown reason, is somewhat hidden, and cannot be seen until you get within 10 feet of it. It is a very imposing affair, properly inscribed, stands 10 feet high and marks the boundary line between the two nations. We were photographed with one foot in Canada and the other balanced gingerly in the United States, and after this happy episode crossed the border and became again regular, law-abiding citizens of the United States.

The road gets better. Soon it is fine, and we wind in and out among the hills and vales of northern Maine, passing Moose Head river, and arriving in the middle of the afternoon at our stopping point, Lake Parlin. This is a famous hunting camp, has a good hotel, several cabins facing along the lake, and the writer's memory is freshened to a hunting expedition of last October when he occupied one of the cabins, his companion being the late John Hill, of New York, and we both agreed that the greatest pleasure of the

On the road from the old French city of Quebec to the Shrine of St. Anne. This distance of 35 miles is literally a 35-mile village. The houses are close together because the farms have a very narrow frontage on the road and extend long distances back. The original land grants aimed at having as many farms front on the highway as possible.

The great tobacco fields of Connecticut through which the motorist drives are indicative of the great changes which have taken place in agriculture in the last few years. The tobacco plant is now successfully grown in New England

The Pinkham farm is 1 mile in the country from any village. The proprietor makes it a business of catering to summer tourists. He has turned the chicken coop into a golf club and his farm into a golf court

hunting trip was to tuck ourselves carefully into bed in this camp, after having put on heavy, lumbermen's socks and all the clothes the place afforded, opening both doors, letting the wind sweep through and the fire in the fireplace gradually die out. The only deer that either one of us saw during the entire week was one that has been tamed and is kept in an inclosure at a neighboring farm. However, in summer it is beautiful.

At 8 o'clock on the following morning we were rolling up and down and in and out through the Maine woods, beautiful road, wonderful patches of sunlight and shadow as the morning sun peeps through the pines and white birch which skirted the road on either side. The camera, which had been working overtime up to this point, was again pressed into service, but as every spot was a picture and every hundred feet a different view, only a few hasty selections could be made.

Hop now insisted that we visit his paper mill at Rumford Falls, and after showing us a mountain of logs and acres of buildings, we were initiated into the mysteries of the sulphide process, through to coated stock. The Oxford plant is the institution of the town. Wonderful water privileges, combined with railway service and proximity to pulp has produced this great enterprise. Hugh J. Chisholm was the first to discover this great opportunity, and having trained the wonderful waterpower to his purpose, he proceeded to establish one of the greatest industries of the State.

On the Way Again

However, after photographing the falls, taking a hasty view of the reconstruction of the water-power plant, we proceeded up the river. For once we missed the famous covered bridge which welcomes you to its inclosure and safety at almost every point where it is necessary to cross the rivers and streams of New England. It being necessary here to cross the Androscoggin, we took advantage of an ingenious Yankee ferry which has accommodations for one motor car only, and where

On such Maine roads as this you meet a motor car or a team of horses once in every half hour and it is difficult to find a more restful touring part of the country from these Maine roads

the current of the river is used as the motove power to propel the boat across the river. Signalling the boat from the other side it began to make its way first down stream and then gingerly it turned its nose along the current, being held in place by a traveling trolley riding on a wire rope which is anchored safely on either side of the river. By lengthening or shortening the trolley ropes at either end of the ferry, and presenting the right angle of the barge to the current, it is thus propelled from one side to the other. Frank had a moment of nervous depression when his beautiful roadster rolled on the top of this tub, and another one when he saw the guard anchoring it to the gravel landing on the other side with a common pike pole to keep the rear wheels from kicking it out from under as we drove off the ferry. However, he soon recovered his equilibrium as we were nearing our destination at the famous Bethel Inn.

When we were shown to our rooms, the guide took us out across the lawn to a couple of well-kept tents, lighted by electricity and situated with the lawn on one side and the golf course on the other. These tents had a new-fangled arrangement of screens whereby if you are not timid you can lower the screens after retiring, and be to all intents and purposes sleeping on the open lawn. But the proximity to the golf course had a bad effect on Hop, and in the middle of the night he began to scream "Fore."

A Worthwhile Part

From Bethel to Winnipesaukee lake by way of Gorham and the Androscoggin is worth the whole trip, if nothing else were to be seen, and from Gorham to Conway, where you strike the White Mountain trail from Boston you pass over an 800-foot elevation opposite Mount Washington, with the buildings on the top of the mountain plainly in sight. This road is undoubtedly swept clean every morning from one end to the other. It is a perfect piece of hard-rolled gravel, as smooth as a billiard table and as clean as a new pin. But at Conway we find we have struck the tourists' famous trail, and now we are not the undisputed monarchs of all we survey, but join the motor procession which, without much stretch of imagination, can be said to reach from Boston to Mount Washington.

At lunch time we were overlooking Winnepesaukee from Pinkham farm at Wolfeboro. Pinkham has turned his barn into a lobby, and the spare room into a guest's room, erected a half dozen tents on the lawn, and accommodates thirty people with one bath tub, but if you want real home cooking, real sausages and cakes, with maple syrup, a wonderful place to sleep and breathe and live, do not pass Pinkham. In the afternoon we were invited to motor by water with Mr. Wood. His boat is about twice the length of our car, but carries a 100-horsepower motor, and skims you over the surface of the water at a rate a little better than 30 miles per hour. We dodged in and out among the 365 islands, making Winnepesaukee what it is.

This is one view of a thousand similar ones you have while motoring in Maine. The road is hedged on either side with shrubs and trees and rises and falls over endless successions of low hills

Thursday, we tried out the Wolfeboro gold course, and took a day off in general for rest and the change of occupation.

On Friday morning we hit the trail accompanied by our children and grandchildren, and, sandwiched in between the greatest number in the Buick and the smallest number in the Scripps-Booth, we made for Mount Washington. Of course, we missed the last train to go up to the top, being misinformed as to when it left, but we enjoyed the lunch party at the Mount Washington, and separated for the balance of the motor trip.

No one ever yet has described the beauties of this particular section which lies between Crawford's Notch and Mount Washington, neither can words convey the idea of the Profile and the beauties encountered in descending from Mount Washington to the Connecticut river. Let us just say that the scenery is magnificent, the roads beautiful and the weather and the company good. In this happy frame of mind we arrived at Hanover, Vt., preferring college towns to the more ordinary hamlets which we passed through for a night stop.

We again took up the trail down the river, passed Claremont and Bellows Falls and Brattleboro without even a peep at the angels on the four corners of the tomb of Jim Fiske, on through Greenfield, then a glimpse of Mount Tom, and we arrived at the Kimball house, Springfield, for lunch, following which we skirted our way through the wonderful old elm-lined town to Long Meadow, out into the tobacco fields of the Connecticut, crossed the long bridge into Hartford, then a beautiful stretch of macadam which was uninterrupted until we arrived at the Taft in New Haven.

Therefore, on Sunday morning, with some regrets that we were so near our journey's end, having enjoyed one uninterrupted stream of scenery, smooth riding, good roads and good company, we strapped on the baggage for the final run, left New Haven at 9:30, and on a perfect road, with two insignificant detours, we rolled into New York and were ready for lunch at the Engineers' Club before the bell rang.

Trip Up to Requirements

Quite possibly other trips have more stupendous and awe-inspiring scenery, with views from impossible heights and immeasurable depths, but for a clean-cut, satisfying motor car experience, we know of no trip better suited to the requirements. If you undertake this trip let me positively advise that you secure, first, the services of Ray, the quiet, careful, consistent driver; that you engage Frank, with his happy smile, which began on Friday morning, August 18, and did not disappear at least before Sunday noon, August 27, and that you also secure for your companion the irresistible and iridescent happy Hop, with his ready "siller" in his pocket, for what is a motor trip with a good car, good roads and wonderful scenery without good fellowship?

Answers to Road Inquiries

Mt. Lebanon, Pa.—Ft. Myers, Fla.

MT. LEBANON, Pa.—Editor Motor Age—I expect to drive to Ft. Myers, Fla., about November 1st, and would appreciate a route to that point.—J. Guy Smith.

In going down to Ft. Myers, Fla., probably your most satisfactory routing will be to go south through W. Elizabeth, Fayette City, Brownsville, over to Uniontown. Then follow the National road through Cumberland, to Hagerstown, then go south to the Shenandoah Valley through Winchester, Staunton, Lexington, Natural Bridge, Troutville, Roanoke, Winston-Salem, Lexington, Salisbury, Charlotte, Kings Mountain, Spartanburg, Greeneville, Anderson, Athens, Madison, Gray, Macon. From Macon you can go either via Perry, Hawkinsville, Waycross, Jacksonville, then along the coast through St. Augustine, Hastings, Daytona, then across Florida to De Land, Orlando, Haines City, Bartow, Arcadia to Ft. Meyers; or you can go direct from Macon to Oglethorpe, Thomasville, Madison, Live Oak, Lake City, High Springs, Gainesville, Ocala, Leesburg, Lakeland, Bartow, then down to Ft. Myers.

Volumes 3 and 6 of the Automobile Blue Book will give you complete running directions for this trip.

Reader Explains Better Road

Hartwell, Ga.—Editor Motor Age—I noticed in the August 10th issue of Motor Age, in answer to A. G. Holmes' request for route information from Jacksonville, Fla., to Lake Toxaway, N. C., you advised going via Savannah, Augusta and Columbia, S. D., which is incorrect. The best way and also the shorter way is via the Dixie highway to Macon, Ga., then via Athens, Hartwell, Ga., Browns Ferry and Anderson, S. C., to Greenville, S. C.

By this route you have a fine road the entire distance from Jacksonville to Greenville, S. C., and as you perhaps know, the other route has some very unsatisfactory roads and several miles are very sandy roads, you will confer a favor on all tourists from Florida, South Georgia or Southern Alabama, by always directing them via the above route, given in Volume 6 of the Automobile Blue Book.—A. N. Alford.

Casco, Wis.—Milwaukee, Wis.

Casco, Wis.—Editor Motor Age—Kindly give the best route from Casco, Wis., to Milwaukee, Wis., via Sheboygan, and return by way of Fond du Lac. What volume of the Automobile Blue Book would cover Wisconsin and northern Illinois, and what is the price?—G. H. Moede.

In going from Casco to Milwaukee, we advise that you go over to Kewaunee, then follow the shore road south through Two Rivers, Manitowoc, Newton, St. Wendel, Sheboygan, Sheboygan Falls, Gibbsville, Cedar Grove, Port Washington, Lakefield Cors., then to Milwaukee.

Volume 4 of the Automobile Blue Book will give you complete running directions for this trip. Price $2.50.

Returning by way of Fond du Lac, we advise that you go via Richfield, Schleisingerville, Nemo, Theresa, Lomira, Byron, into Fond du Lac. From here you can drive on either side of Lake Winnebago to E. Wrightstown, then through Greenleaf, to Green Bay, and through New Franken to Casco.

Indianapolis, Ind.—San Antonio, Tex.

Indianapolis, Ind.—Editor Motor Age—Kindly give the best route and approximate mileage from Indianapolis, Ind., to San Antonio, Texas.—H. H. H.

The best routing between Indianapolis and San Antonio is to go via Rockville, Terre Haute, Paris, Mattoon, Shelbyville, Pana, Litchfield, St. Louis, Warrenton, Columbia, Marshall, Lexington, Independence, Kansas City, Olathe, Ottawa, Emporia, Florence, Newton, Wichita, Wellington, Caldwell, Medford, Enid, Kingfisher, El Reno, Geary, Anadarko, Lawton, Wichita Falls, Bowie, Ft. Worth, Cleburne, Meridian, Waco, McGregor, Temple, Sparks, Bartlett, Granger, Austin, into San Antonio.

Volumes 4 and 5 of the Automobile Blue Book will give you complete running directions for this trip.

South Haven, Mich.—La Fayette, Ind.

South Haven, Mich.—Editor Motor Age—Kindly give best route between South Haven, Mich., and La Fayette, Ind.—Frank P. Robinson.

In going from South Haven, Mich., to La Fayette, Ind., we advise that you go through Watervliet, Coloma, Benton Harbor, St. Joseph, Buchanan, South Bend, Lakeville, Plymouth, Culver, Logansport, Deer Creek, Camden, Delphi, into La Fayette.

Volume 4 of the Automobile Blue Book will give you complete running directions for this trip.

Cleveland, Minn.—Isabel, S. D.

Cleveland, Minn.—Editor Motor Age—Kindly give the best route from Cleveland, Minn., to Isabel, S. D., via the Yellowstone Trail if there is not a better route.—T. J. Lloyd.

In going to Isabel, S. D., we advise that you go via St. Peter, Henderson, Arlington, Glencoe, then west through Browntown, Stewart, Buffalo Lake, Hector, Olivia, Renville, Minnesota Falls, Granite Falls, Montevideo, Milan, Appleton, Ortonville, Milbank, Twin Brooks, Summit, Waubay, Webster, Bristol, Andover, Groton, Aberdeen, Ipswich, Roscoe, Bowdie, Java, Selby, Glenham, Mobridge, then to a town known either as Cheyenne, Jct., or Trail City, from there to Timber Lake and Isabel.

Volume 5 of the Automobile Blue Book will give you complete running directions from Glencoe to Mobridge.

Chicago—Necedah, Wis.

Chicago.—Editor Motor Age—Kindly give the best route from Chicago to Necedah, Wis.—T. F. Masterson.

In going from Chicago to Necedah, Wis., we advise that you go via Grand Ave., to Addison, then on the direct road into Elgin, turn north going through Algonquin, Crystal Lake, Ridgefield, Hebron, Lake Geneva, Elkhorn, Whitewater, Ft. Atkinson, Cottage Grove, Madison, Ashton, Sauk City, Kings Cors., Baraboo, Reedsburg, Lavalle, Union Center, Elroy, New Lisbon, into Necedah.

Volume 4 of the Automobile Blue Book will give you complete running directions for this trip.

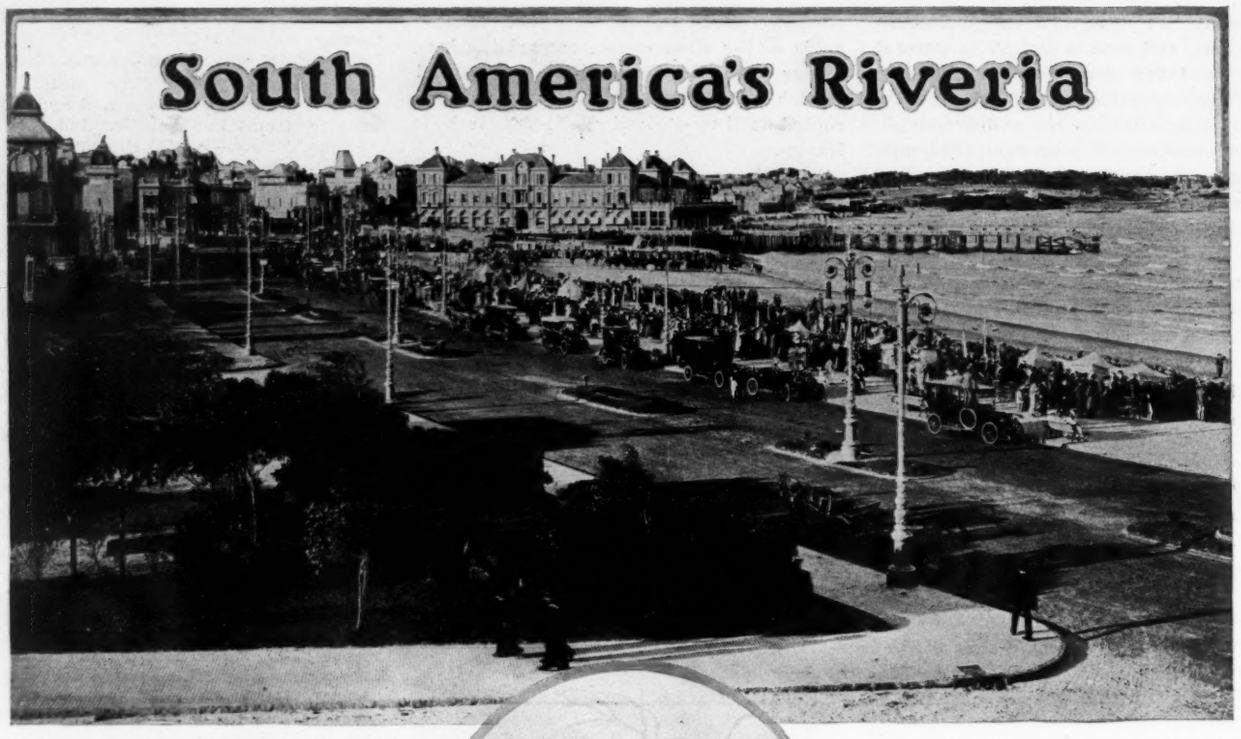
New Windsor, Ill.—Sedalia, Mo.

New Windsor, Ill.—Editor Motor Age—Kindly give the best route from New Windsor, Ill., to Sedalia, Mo.—J. C. Willett.

In going from New Windsor, Ill., to Sedalia, Mo., we advise that you go over to Aledo, then south through Little York, Monmouth, Reseville, Raritan, La Harpe, Burnside, Carthage, Hamilton, Lima, Ursa, Quincy, Hannibal, New London, Center, Laddonia, Mexico, Columbia, Rocheport, New Franklin, Boonville, then over to Sedalia.

Volumes 4 and 5 of the Automobile Blue Book will give you a routing down to Boonville. Here make local inquiry to Sedalia.

South America's Riveria



In catering to the tourist trade Montevideo is building an excellent double-drive, waterfront boulevard, a section of which is shown here. Note the artistic electric light poles, European type of bath houses and general atmosphere. The background shows a summer hotel, a model of its kind

National road from Montevideo to Brazil, costing $10,000 a mile

Uruguay Is Ambitious to Be a Resort Community

Montevideo, the Capital, Already Attracts Motorists

By David Beecroft

Editor's Note—This is the sixth of a series of articles on South America by David Beecroft, managing editor of Motor Age, who has just completed a lengthy trip through the Argentine, Uruguay and southern Brazil. In the preceding article, published in two Motor Age issues, August 24 and 31, the author wrote of "Buenos Aires, the Queen City."

Uruguay is distinguished as being the youngest and the smallest country in South America. Notwithstanding these two handicaps, it has as great motoring ambitions as any South American country.

Uruguay's major ambition is to be the great pleasure-ground for the lands south of the equator. It has already started on this route of travel and has been making good high-gear speed for several years. Uruguay aims at no less a position than that of the Riviera of South America.

Uruguay's Highways

These ambitions are not day-dreams, and they are fast becoming realities. Today Uruguay has more improved highways for motoring than Argentina, Brazil, Chile or any other South American country. So far is her great dream of being the Riviera beneath the Southern Cross already realized. The wealthy Argentines ship their motor cars by boats, a night's trip of 90 miles, from Buenos Aires to Monevideo to enjoy the fine system of roads now under construction by the Uruguayan national government. Brazil's wealth also seeks the highways of Uruguay for recreation and motoring joys.

Uruguay has gone farther in its dream of being the pleasure-ground for the South American lands beyond the equator. Montevideo itself is a modern, attractive city of 375,000 and is today the acknowledged summer resort of the east coast. It is the great surf-bathing center; it is building fine tourist hotels, with comforts rivalling those of North America. In season and out of season the city takes on a holiday and tourist complexion.

The city fronts on the Atlantic and the coast line is now a veritable tourist's paradise. There are long sand beaches crowded with the bathing houses of Ostend, Brighton and other famous European bathing centers.

A double-drive boulevard system, with a motoring surface that vies with our most modern roads in New York state or New Jersey, is being built along the beach, and much has been accomplished already. Plans are to continue this system of beach motoring highway from Montevideo along the shore toward Buenos Aires and Colonia across the Plata river from Buenos Aires, and when this materializing dream has been realized, the Argentine motorist will ferry from Buenos Aires to Colonia and thence motor to Montevideo, where he can bathe and take a holiday to his heart's content.

Day-dreams of Uruguay

But Uruguay has still greater motoring day-dreams, still greater motoring conceptions, that are already on the road to partial realization. Her biggest dream is that of a transcontinental road from Rio de Janiero, Brazil, to Santiago, on the west side of the snow-capped Andes in Chile. The highway would be called the San Martin transcontinental road of South America, San Martin being a great national hero, the George Washington of Argentine. Such a highway from Rio would pass through Sao Paulo, the Chicago of Brazil, and would then cross Uruguay from north to south. There would be a ferry connection with Buenos Aires, after which the 888 miles to the Pacific ocean would carry the route through such Argentine cities as Rosario, Cordoba and Mendoza. Here at the foothills of the Andes the route would climb the 10,000 feet as does the railway and then suddenly drop to the Pacific coast. This great highway is but a vague, indefinite dream, but Uruguay already has started on its link of this great highway that would cross the confines of four great

lands: Brazil, Uruguay, Argentine and Chile.

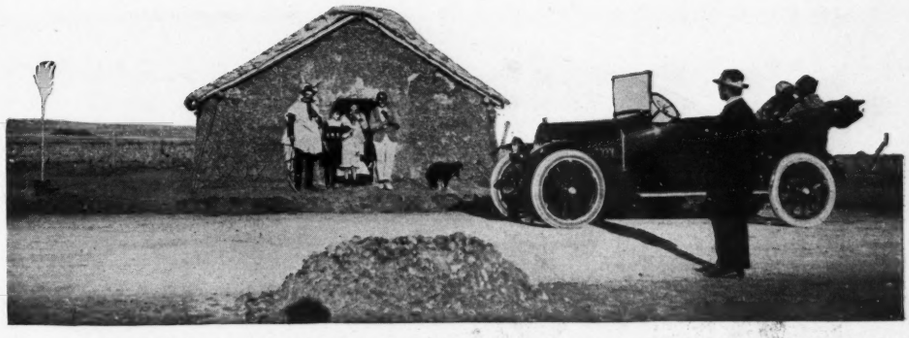
Uruguay's share in this transcontinental dream of a four-country highway is a modern macadam road from the capital city of Montevideo on the south coast to the city of Rivera on the northern boundary between Uruguay and Brazil. As Uruguay is equal in area to New England, with the state of Maryland thrown in, or equal in area to our state of Nebraska, or to the state of Sao Paulo in Brazil, its road distances are not magnificent like those of Argentine and Brazil. From Montevideo to Rivera it is but 571 kilometers. This is 355 miles.

Already Uruguay has 20 per cent of this highway built or nearly built, and the road she is constructing is not only a credit to herself but a national monument to all South America. For 110 kilometers, practically 70 miles, you can motor out of Montevideo on these new highways. They are graded like a railroad right-of-way. Low hills are cut down and valleys filled just as when a railroad builds its roadbed. The surface is broken, stone rolled and packed with the same kind of steam roller that we use in Indiana or Ohio.

Six Years Building Road

This Uruguayan national highway has been under construction for more than 6 years and is costing approximately $10,000 a mile. The road surface is 24 to 32 feet wide and on either side is a well-formed drainage ditch. Rows of trees line the road and when these reach maturity the highway with its long straight stretches will bear striking resemblance to the great tree-lined billiard-table roads of France.

Today you can average 25 to 30 miles an hour on this highway in the dark; so when the system is completed South America will offer no finer roads than those of Uruquay.



One of the roadside mud huts, the black spots on the face of a fair country

This one stretch of 70 miles from Montevideo to the small city of Florida is not the only improved highway—there is a fine road to San Jose from Montevideo, a distance of 65 miles—there are other shorter stretches that radiate from Montevideo to other small cities located within a radius of 50 miles from the city.

But, and every letter in that word "but" should be written in capitals, there are many miles of roads in Uruguay that are impassible, simply as bad as parts of northern Mississippi where the Glidden tourists mired on the now-historic tour from Cincinnati to Chicago by way of Dallas, Tex.

Uruguay has already done much, but multitudes of roads await the road scraper, the grader and the steam roller. Some of the roads connecting Montevideo with such important cities as Salto, Paysandu, Mercedes, Derazo and Melo are impossible in the wet seasons. Many of the streams are without bridges; there are no ferries and you may have to hire a flat car and wait a day or more to get across a rain-swollen stream. An example is the Rio Negro, a river that crosses the country from east to west and divides it into upper and lower halves. There are as yet no motor bridges over this river. To get your car over you hire a flat car, if you can secure one, and if you cannot you wait until you can or until some ferry arrangements have been made.

Isolated Cities Buying Cars

Yet the isolated cities throughout Uruguay are rapidly buying motor cars where there are no roads or bridges today, and these U. S. A. motor cars are planting seeds of good roads and good bridges that will be the fruits of tomorrow.

Estimates as to the total number of motor cars in Uruguay vary. There is no registration for the entire country. You register in the different cities and departments. It is generally agreed that there are about 6,000 cars in the country, of which more than 50 per cent are in the capital city, Montevideo.

Our U. S. A. cars are today selling well not only in the city but in the country,

One of Montevideo's main streets, ideal for motoring. Montevideo has 375,000 inhabitants, Uruguay only 1,300,000, but the country has a larger population for square miles than any other South American country

The waterfront drive is already built for several miles. Plans call for many more miles. Uruguay has more miles of good highways than any other South American country, though a patch in comparison of areas

or "campo," as they designate it. Ford claims to have sold more than 800 cars in the country. There are eighty or more Studebakers, seventy-five Buicks, and fifty Chevrolets. We could not get an estimate on Overlands, Maxwells and other makes.

Montevideo Distributing Point

Montevideo is the distributing center for the entire country and here you find dozens of motor car agencies and dozens of good garages. You see up-to-date agencies for such U. S. A. makes as Ford, Overland, Buick, Studebaker, Hupmobile, Dodge, Maxwell, Chevrolet, Cadillac, Jeffery, Hudson, Haynes, Pierce-Arrow, King and a few others. Our tire makes, such as Goodrich, Goodyear, Firestone, Fisk, U. S. and some others are well represented, and not a few of our accessories are on sale in the supply houses and garages.

Montevideo, like Argentina, Brazil, Chile and every other South American country, is filled with costly European cars. The streets are crowded with the finest limousines, touring cars and landaulets. Before the war two or three of the biggest Montevideo dealers journeyed annually to Europe to order from the finest builders of France, England and Germany the most luxurious bodies, those that would outrival London, Paris, Berlin, or Antwerp. Nothing was too good for the Uruguayan. They aped Europe and looked there for the last word in motor car lore and science.

In those days our cars were in ill-repute. But the war altered circumstances. Today we are in Uruguay's good graces. It believes in our cars and is buying them. It is buying them for the campo and not for the cities. The cities yet look to Paris or London and think the U. S. A. makes good for the necessities of life, but not for the luxuries and not the artistic.

It took strong persuasion to get some of the Montevideo dealers to take up the U. S. A. car. Danree & Co. sold the Delaunay-Belleville and after persuasion took the Dodge. They already have sold many more than they originally contracted for. Barth, the Chevrolet agent, has sold many more in a few months than his entire contract stipulated. . The Ford dealer has not been able to keep a car on the floor since October a year ago and is months behind in shipments. The Studebaker is doing a good business with the large estancieros, or big farmers. The Overland has a good trade. The Hupmobile is handled by a society man who is building special town bodies and getting the fashionable trade that used to go to Renault and Fiat. Agencies for many of our cars have only recently been placed in Montevideo. The Jeffery agency was placed in June, Dodge, Scripps-Booth, and others a few months earlier. Nineteen sixteen will be recorded as a strong year for U. S. A. cars in Uruguay.

On the beach at Montevideo. Here all the city ride and motor

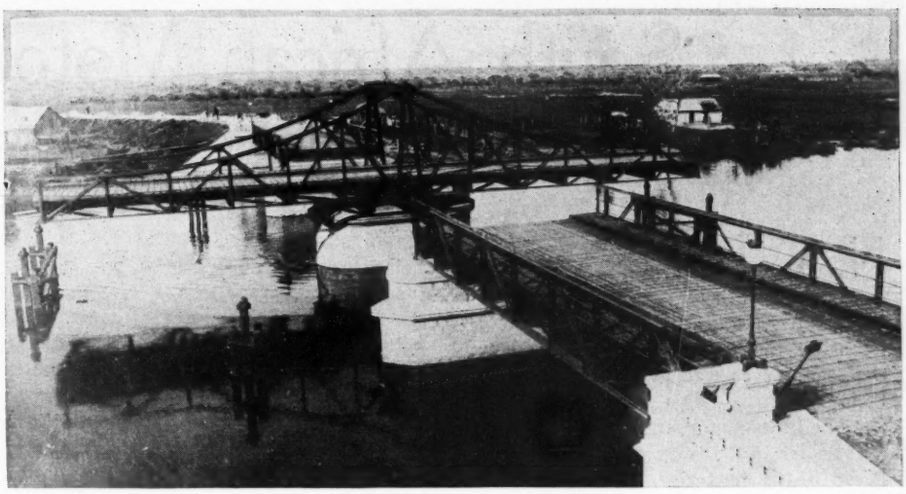
American Cars Go to Farms

More than 75 per cent of U. S. A. cars sold go to the estanciero. There are 25,000 of these estancieros in the country and while many are not financially strong enough today to buy cars, each needs one and must be considered as a gilt-edged prospect. It is to these 25,000 we recommend our manufacturers to direct their prime selling endeavors. Studebaker is selling 90 per cent of its cars to these farmers. Ford sells 75 per cent to them and Chevrolet reports 75 per cent sales to them. With Hupmobile the percentage is less. Overland should average 80 per cent or higher to the estanciero.

The car needed for the campo, or country districts, in Uruguay is a five-passenger touring car, though there is a growing market for roadsters. The car must have

a 56-inch tread, steering wheel on the right side and a clearance of not less than 10 inches. The standard 56-inch tread serves admirably as the huge Argentine cart is not found in Uruguay and the smaller-capacity carts used are of 56-inch tread. Clearance is a prime essential. The roads in general demand 10 inches. Sending cars with less clearance will mean difficult sales and fewer sales. In Uruguay you pass on the left. The rule is the opposite of ours in U. S. A.; hence the steering wheel on the right side is essential. For city use in Montevideo right-side steering is as desirable as left-side steering in the crowded streets of Chicago, New York and St. Louis.

Gasoline prices are high in Uruguay, approximately the same as in Argentine and Brazil. The fuel is all imported; hence the high price. In June gasoline was selling at $4.20 for 9.5 gallons, sold in the conventional 5-gallon cans. In Uruguay $4.20 means more real money than in the U. S. A. You are shocked when landing in Montevideo to discover that our U. S. A. dollar is not worth as much as the Uruguayan dollar. It is the only place in South America where such a condition exists. In Brazil $1 is worth four times as much as the Brazilian dollar or milreis. In Argentine the peso, or dollar, is only worth 44 cents U. S. A. gold, but here in Uruguay the tables are turned. Our dollar is worth less than the Uruguayan. Give a $1 Uncle Sam bill and you are allowed only 95 cents Uruguayan currency for it. On this basis the gasoline price is 50 cents a gallon, or nearly two and one-half times that in the U. S. A. This price is shown when we think of Johannesburg, British South Africa, where the price is today 88 cents for the imperial gallon which is one-sixth larger than our standard gallon measure. Owing to the gasoline cost large cans are not strong favorites. Money is rather stringent at present and a few motorists have stored their large European cars in preference to paying so much for fuel.



A modern type of swinging bridge. In the distance appears the road building activity

Although Uruguay is not a large country and not a big market for our cars, it is well worth developing. Spanish is the business language, but there are nearly a dozen dealers who understand English. A U. S. A. representative on a business mission should know Spanish before attempting to make the best agency selection.

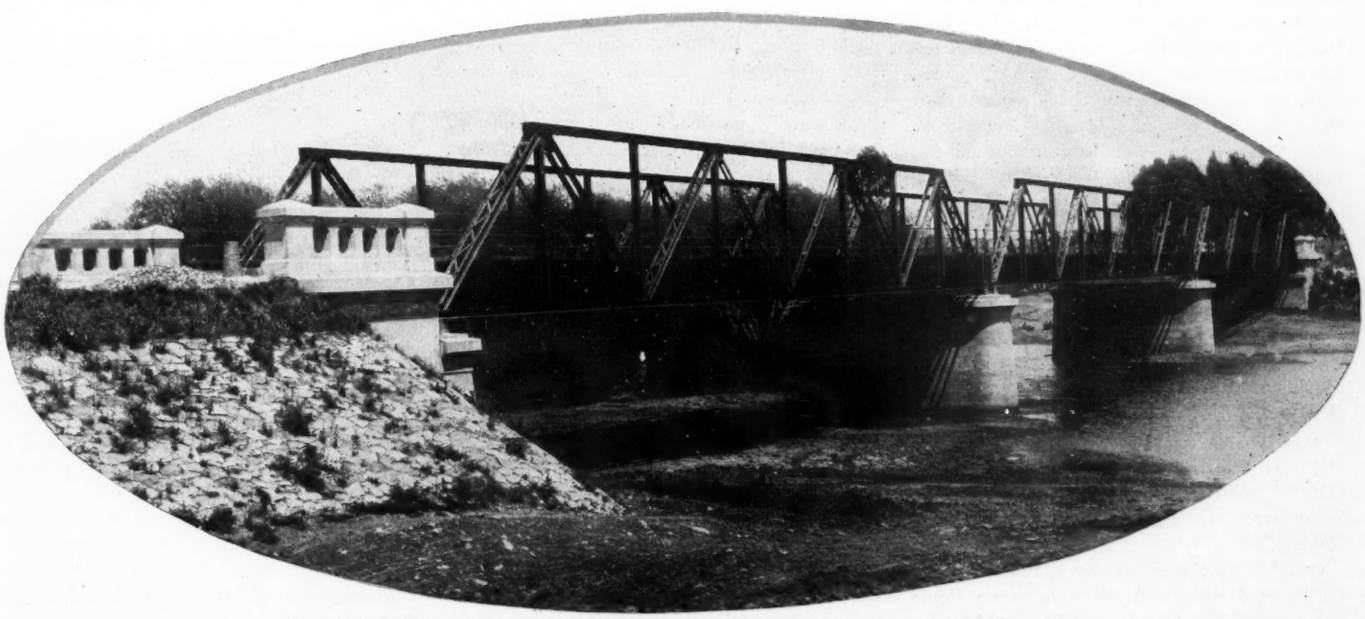
Uruguay Has 1,300,000 People

Uruguay has a population of 1,300,000. It is smaller than the city of Buenos Aires, but has a pure white population, one of the purest in all South America, and as such its buying potentialities per 1,000 population are much higher than in those countries where there is a mixed population.

The motor car selling season dates from October 1 to March 31. Snow never falls, but there is a distinct winter in June, July and August, and owing to many hotels not being heated you suffer more from the cold than you do in a winter in Detroit or Buffalo. Car sales do not stop entirely, but decrease much as they do in our own winter months.

Throughout Uruguay, along or near the southern shore, very attractive resorts and towns that will eventually be absorbed in the great Reviera plans of the country are springing up. Colonia is across the Plata from Buenos Aires with boat service already established. Three miles from Colonia is Real de San Carlos, where there are tourist attractions and where a large tourist hotel is planned.

The spirit of the Uruguayan is the spirit of the twentieth century, and while this country is the smallest in South America, and the youngest, it has the greatest population per square mile and it has as progressive a spirit as exists south of the equator. Its people are dreaming daydreams that already are assuming definite shape. It is a country to get acquainted with. It is a country badly in need of population, but there are many other parts of the globe in similar need. Uruguay needs our motor cars and we should avail ourselves of this waiting market. She needs our accessories. She needs a few of our heavy motor trucks and very many of our light delivery vehicles.



A modern bridge on the national highway, a modern steel structure with stone surface

South African Motor Trade

Johannesburg Dealer Visits America and Tells Conditions in Lower Africa

NEW YORK, Sept. 8—One of the largest and best known motor car dealers in British South Africa is at present in this country, making arrangements for distributing U. S. A. accessories throughout that country as well as traveling over the United States. This person is William Campbell, Johannesburg, who is the Maxwell dealer in that city and also represents Prest-O-Lite batteries, Simms magnetos, and other U. S. A. products.

Mr. Campbell, a Scotchman by birth, has the reputation of being one of the shrewdest dealers in that country. In the last 9 months he distributed over 600 Maxwell cars, and will exceed that figure very materially this year. He recently sold fifty to the government for war purposes in German East Africa.

According to Mr. Campbell, the U. S. A. cars are selling in greater quantities than any other cars in British South Africa. This is partly due to the fact that European cars are not available, and also to the fact that our cars are low-priced and well suited for the rough roads of British South Africa.

Farmers Biggest Buyers

The majority of U. S. A. cars are sold to farmers who reckon their land in morgens instead of acres. A morgen equals 2.5 acres and many of the farmers own 1,000 or more morgens. South Africa thus resembles Argentina in that it is not a land of small farmers as in our Mississippi large farmers, this being due to great areas and sparse population.

At present Ford is the biggest seller in British South Africa, with Maxwell a close second. Other large sellers are Overland, Buick, Studebaker, Hupmobile, Chevrolet, Dodge, and Cadillac. Cadillac has been the largest seller of U. S. A. high-priced cars. From four to six times as many of these cars have been sold since the war as prior to it, a condition largely due to the inability to secure European cars.

British South Africa is a country without roads. In this respect it is worse than Australia, worse than Argentina and practically as bad as Brazil. In Johannesburg, a city of 200,000 whites, there are good roads no further than 5 miles out in the country. In British South Africa the population of cities is generally estimated on the number of whites, as they represent the potential purchasing capacity of the city. In addition to these whites there are 500,000 colored in the Greater Johannesburg area, giving a total population of 750,000.

Outside of the cities the roads are mere trails, two ruts, and often between these the ground is 6 to 8 inches high which demand cars of good clearance, 10 inches being best suited for the work. In many places the cars are driven directly across the veldt or plains. Recently Mr. Campbell made a trip of 1,826 miles driving from Cape Town at the south end of the continent to Johannesburg. The distance between these two towns is 1,000 miles by direct route. Generally speaking, there are few if any bridges, making fording essential.

According to the rules of the road in British South Africa you pass to the left, instead of to the right as we do. This calls for cars with steering wheel on the right-hand side the same as required in South America, Australia, and England. The five-passenger touring car is the big seller. The sale in roadsters is perhaps 10 per cent that of touring cars. There is a very limited demand for coupes, but practically none for sedans or cabriolets.

Mr. Campbell can place no practical estimate on the total number of cars in British South Africa. The figure is somewhere in the 15,000 range. The country has a total population of 1,250,000, or a little less than Uruguay in South America.

At present there are approximately the following number of motor cars in the following cities:

Johannesburg	6,000
Cape Town	4,000
Durban	500
Bloemfontein	500
Port Elizabeth	400
East London	300
Kimberly	200

The high price of gasoline is a big factor in South Africa where the Imperial gallon retails at 88 cents in Johannesburg, but a little lower at Cape Town and other coast cities. The Imperial gallon is approximately one-sixth larger than the gallon used in the U. S. A. With gasoline at this price it is essential to have cars that will show good performances and 30 to 35 m. p. g. is necessary. Gasoline is handled in British South Africa much the same as in England, namely in crates of two 5-gallon cans each. Handling it by bulk has not yet been undertaken.

The possibilities of U. S. A. accessory manufacturers is good in British South Africa. Already many of our leading accessories are handled there. Some of them are sold through New York exporting houses, and others are handled through large distributors who deal direct with the U. S. A. manufacturers. There is a big market for pumps of all kinds, head lights, shock absorbers, searchlights, dash lights, and in general all car fitments, that is, little devices that really improve the value of the car to the owner.

Unfortunately U. S. A. accessory trade in British South Africa has suffered because our accessory makers have not been dealing direct with the big distributors in that market. As a result some lines of goods that should be in much demand there are in ill favor. This is not due to the goods themselves, but to the houses handling them. There are some houses that have rather unsavory reputations in that country and it is certain the sale of products is going to suffer because of such. In South Africa, the same as in Australia and South America, the motor car trade is sufficiently large to warrant our manufacturers dealing direct with the large houses in that country.

There is a good chance in British South Africa, according to Mr. Campbell, for a U. S. A. light-type car, built on the lines of the English Singer. It should be a two-seater that would sell for $1,000 and show 35 miles per gallon of gasoline. Such a car would have to have good lines.

Electrics in Demand

Owing to the high price of gasoline there is a good demand for electric passenger and commercial vehicles. With gasoline at 88 cents per gallon and electricity at 2 cents per kilowatt, there is good opportunity, particularly in Johannesburg, for selling electrics.

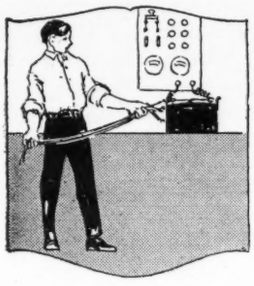
At present the commercial vehicle business in Johannesburg is largely confined to fitting delivery bodies on such chassis as Overland, Studebaker, Maxwell, Ford, etc. Much of this has been done in the last year and the market is increasing.

Johannesburg is destined to be the great motor car distributing center for British South Africa. It has by far the largest population and is surrounded by a productive country. The city is located on a plateau 6,000 feet high, 1,000 feet higher than Denver, Colo., and has a climate practically the same as Los Angeles. Many of the staples in the surrounding country are corn, cotton, tobacco, oats, other cereals, and fruits in every variety.

ELCAR FOR 1917 ANNOUNCED

Elkhart, Ind., Sept. 8—The 1917 Elcar selling at $795 has been announced by the Elkhart Carriage and Motor Car Co. There are two body types, the Clover-Leaf roadster, seating four passengers, and a five-passenger touring car.

The specifications include a long-stroke motor, 3½ by 5; unit power plant; three-point suspension; 114-inch wheelbase; full-floating rear axle; Delco ignition; full Turkish style upholstering.



Electrical Equipment of the Motor Car

By David Penn Moreton & Darwin S. Hatch.

Editor's Note—Herewith is presented the twelfth installment of a weekly series of articles which began in Motor Age issue of June 29, designed to give the motorist the knowledge necessary to enable him to care for and repair any and all of the electrical features of his car, no matter what make or model it may be. At the conclusion of this series, "Electrical Equipment of the Motor Car," with additions, will be published in book form by the Class Journal Co., Chicago, in a size to fit the pocket conveniently.

WHAT HAS GONE BEFORE

The fundamentals of electrical circuits of the motor car were explained through their analogy to water systems and the relations of current pressure and resistance brought out. This was followed by an explanation of series and multiple circuits, and how electricity is made to do work in lighting, starting, signalling, etc. Calculating the capacity of a battery for starting and lighting and the cost of charging storage batteries and determining the torque a starting motor must develop were explained. Action of primary batteries and dry cells were taken up and the best methods of connecting them. A separate section was devoted to the makeup and action of lead and Edison storage batteries, and another to the care of lead batteries in service and best methods of charging them. Magnets and magnetism then were considered.

Part XII—Electromagnetic Induction

ABOUT 1831, Michael Faraday discovered that an electrical pressure was produced in a wire that was moved in a magnetic field, when the direction of the motion of the wire was such that it moved across the imaginary lines of force forming the magnetic field. If this wire be made a part of a closed electrical circuit, the electrical pressure produced in the wire will cause a current of electricity in the circuit. Electrical pressures produced in the above manner are called *induced pressures* or *induced locomotive forces,* and an electrical current produced by an induced electromotive force is called an *induced current,* and the phenomenon is called *electromagnetic induction.* In this great discovery lies the fundamental principle of the operation of many forms of ignition, starting and lighting apparatus such as magnetos, electrical generators, induction coils, etc.

Currents Induced in a Wire by a Magnet

If a wire AB, Fig. 95, that is connected in series with a galvanometer—an exceedingly sensitive ammeter—be moved in the magnetic field of a magnet, the needle will be deflected from the zero position. This deflection of the galvanometer is due to a current in its winding which is produced by the induced electromotive force in the wire that is moved in the magnetic field. When the movement of the wire in the magnetic field ceases, the galvanometer will show no deflection, which indicates there is no current and hence no induced electromotive force. Hence, the wires must be actually cutting the lines of force that are supposed to form the magnetic field in order that there be an induced electromotive force produced in the wire.

If the wire were moved to the left, as indicated by the arrow C, across the magnetic field and the deflection of the galvanometer happened to be to the left, it will be found upon moving the conductor to the right, as indicated by the arrow D, or in the direction opposite to its motion in the first case, that the galvanometer will be deflected in the opposite direction from its zero position. Since the direction in which the indicator of a galvanometer is deflected depends upon the direction of the current through its winding, it is very apparent that the direction of the circuit in the second case is opposite to what it was in the first case; and, since the current is due to the induced electromotive force in the wire, it must also be in the opposite direction. If the motion of the wire in the magnetic field is continuous right and left, between the ends of the magnet, there will be a current through the galvanometer first in one direction and then in the opposite direction and the moving part of the galvanometer will swing to the right and left of the zero position. The motion of the wire, however, may be rapid enough so that the moving part of the galvanometer has not sufficient time to take its proper position with respect to the current in the circuit, and as a result it remains practically at zero, the movement or deflection to the right or to the left being very small.

The same results can be obtained when the magnet is turned over and the south pole is at the top and the north pole at the bottom, except that the deflection of the galvanometer due to a

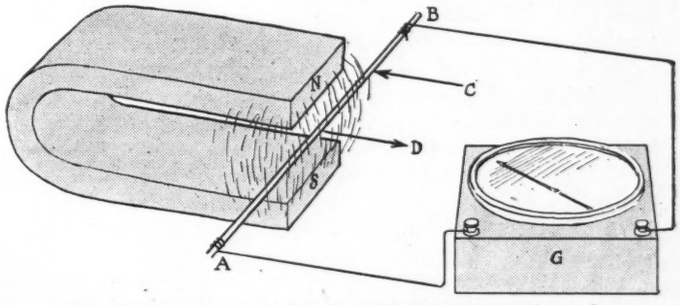


Fig. 95—If a wire is moved in the field of a magnet, an electrical pressure is generated in the wire

given direction of motion of the wire will be just the reverse of what it was with the magnet in the original position. This shows that there is some definite relation betwen the direction of motion of the conductor, the direction of the magnetic field and the direction in which the induced pressure acts.

If the wire were held stationary and the magnet moved, the same results would be obtained as though the wire were moved between the poles of the magnet with the magnet stationary. Hence, it is only necessary that there be a relative movement of the wire and the magnetic field; either may remain stationary.

An electromagnet may be used instead of a permanent magnet and the same results will be obtained under quicker conditions.

If the wire be moved very slowly across the magnetic field, the galvanometer will be deflected to a smaller extent than it would be if the wire were moved faster across the magnetic field. This deflection of the galvanometer depends upon the value of the current sent through it and since the deflection is smaller when the wire is

moved slowly than it is when the wire is moved fast, it must follow that the induced pressure for a slow movement of the wire is less than it is for a fast movement, even though all the magnetic lines forming the magnetic field be cut in each case. The above experimentally determined results show that the value of the induced electromotive force in a wire, due to a relative movement of a wire and a magnetic field, depends upon the velocity of the wire. If a second wire be connected in series with the first, so that the induced electromotive forces act in the same direction, the resultant, or effective, electrical pressure is increased. This is equivalent to increasing the length of the wire in the magnetic field.

The electrical pressure may be increased by placing a second magnet along the side of the first so that the like poles are adjacent. This second magnet increases the strength of the magnetic field and the wire cuts more lines of force when it is moved.

If the wire be moved in a path parallel to the lines of force forming the magnetic field there will be no deflection of the galvanometer, which indicates there is no current in the circuit and hence no induced electrical pressure produced in a wire due to its movement with respect to a magnetic field. The path in which the wire moves must make some angle with the direction of the magnetic lines of force. The value of the induced pressure due to the move-

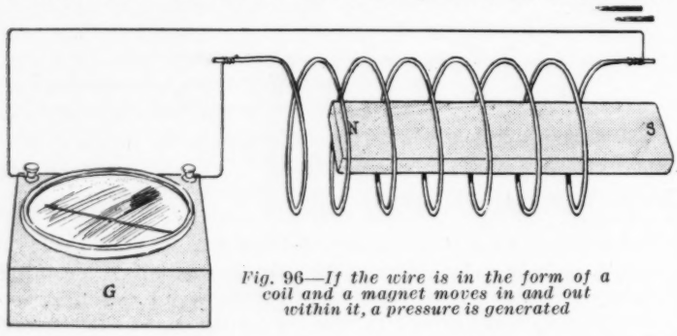


Fig. 96—If the wire is in the form of a coil and a magnet moves in and out within it, a pressure is generated

ment of a wire and a magnetic field with respect to each other will increase as the angle between the direction of the lines of force and the path in which the wire moves increases, and it will be a maximum when the wire moves in a path perpendicular to itself.

There will be an induced pressure set up in the wire even though the circuit of which the wire forms a part be open. This induced pressure will exist between the terminals of the circuit where it is opened just the same as an electrical pressure exists between the terminals of a battery that is on an open circuit.

The question arises: Is the magnet weakened when it is used in producing induced pressures in a wire and if not, what is the source of energy that causes the current to exist in the wire? The magnet is in no way weakened when it is used as described and the induced current is produced by the expenditure of muscular energy in moving the wire, just as the expenditure of chemical energy in a cell produces an electrical current in a closed electrical circuit in which the cell is concealed.

When a wire with a current in it is located in a magnetic field there is a force acting on the wire which tends to cause the wire to move across the field. The direction of this force is just the opposite to the one that must be applied to the wire to cause it to move, so there will be an induced pressure set up in the wire which will produce the current. In other words, the induced pressure set up in a wire will always be in such a direction that the current produced by it will oppose the motion of the wire.

Current Induced in a Coil by Moving a Magnet

If a coil of wire be connected in series with a galvanometer as shown in Fig. 96, a deflection of the galvanometer indicator can be produced by thrusting the magnet in and out of the coil. The fact that part of the galvanometer indicator is deflected when the magnet is moved inside the coil is proof that there is a current produced in the circuit and it must be due to an induced pressure. When the magnet is thrust into the coil, a deflection of the galvanometer indicator will be produced, say, to the right, and when the magnet is withdrawn the galvanometer indicator will move to the left. If the magnet be turned end for end, the deflections of the galvanometer indicator will be just the reverse. If the coil itself be turned end for end and the magnet placed in its original position the deflection of the galvanometer indicator produced by a movement of the magnet in or out of the coil will correspond in direction to those produced when the coil was in its original position and the magnet had been turned end for end.

If the coil be moved on or off the magnet, the same results will be obtained as when the magnet was moved in or out of the coil. The value of the induced pressure in this case, as in the previous one when the wire was moved in the magnetic field, will depend upon the velocity with which the magnetic field and coil move with respect to each other.

If the number of turns of wire composing the coil be increased or decreased, there will be a corresponding increase or decrease in the value of the induced pressure in the winding of the coil due to a given movement of the coil and magnet with respect to each other. The induced pressure in the various turns of the coil will all act in the same direction, and the effective pressure is equal to the sum of the induced pressures in the various turns. The induced pressure in each of the turns will have the same value at any instant, provided each turn is cutting the same number of lines of force at that particular instant.

Value of the Induced Pressure

From the discussion above, it is seen that the induced pressure in an electrical circuit depends upon the following things:

(a) The velocity of the wire and the magnetic field with respect to each other. The greater the velocity, the greater the induced pressure, all other things remaining constant.

(b) The strength of the magnetic field, that is the number of lines of force per square centimeter. The stronger the field, the greater the induced pressure, all other things remaining constant.

(c) The angle the path in which the wire moves makes with the direction of the magnetic field. The nearer this path is to being at right angles with the direction of the magnetic field and the axis of the wire, the greater the induced pressure.

(d) The length of the wire actually in the magnetic field. The more wire there is in the magnetic field, the greater the induced pressure, all other things increasing constant.

All of the above facts can be condensed with the following simple statement: The value of the induced pressure in any electrical circuit depends upon the rapidity with which the wire forming the circuit cuts magnetic lines of force; that is, it depends upon the number of lines of force cut per second by the wire.

When the wire cuts one hundred million lines in each second during its movement with respect to the magnetic field, an electrical pressure of 1 volt will be induced in the wire.

If the wire cuts line of force at the rate of two hundred million lines of force per second, the induced pressure will be 2 volts; and if the wire cuts six hundred million lines of force per second, there will be an induced pressure of 6 volts. If the circuit in which this induced pressure is produced be closed, there will be a current produced equal in value to the induced pressure divided by the total resistance of the circuit.

Example: A wire cuts across a magnetic field of 10,000,000 lines of force 60 times per second. (The conductor always moves across the field in the same direction.) What is the value of the pressure induced in the wire?

Solution: A wire cutting 10,000,000 lines of force 60 times per second is equivalent to a conductor cutting 60×10,000,000, or 600,000,000 lines of force once per second. If a conductor cuts 600,000,000 lines of force per second, the value of the induced pressure will be equal to 600,000,000 divided by 100,000,000 or 6 volts.

NEXT WEEK

Induction coils is the subject of the next installment of this series and explains the theory of the spark coil.

From the Woman's Viewpoint

Some Little Things Gleaned from a Motor Row

By Ruth Sanders

IF Lewis Carroll were rewriting "Alice in Wonderland" today, he probably would have the rabbit greet Alice with the words, "The motor car waits, my lady," instead of by looking at his watch and exclaiming, "Oh, dear, I shall be late, I know!"

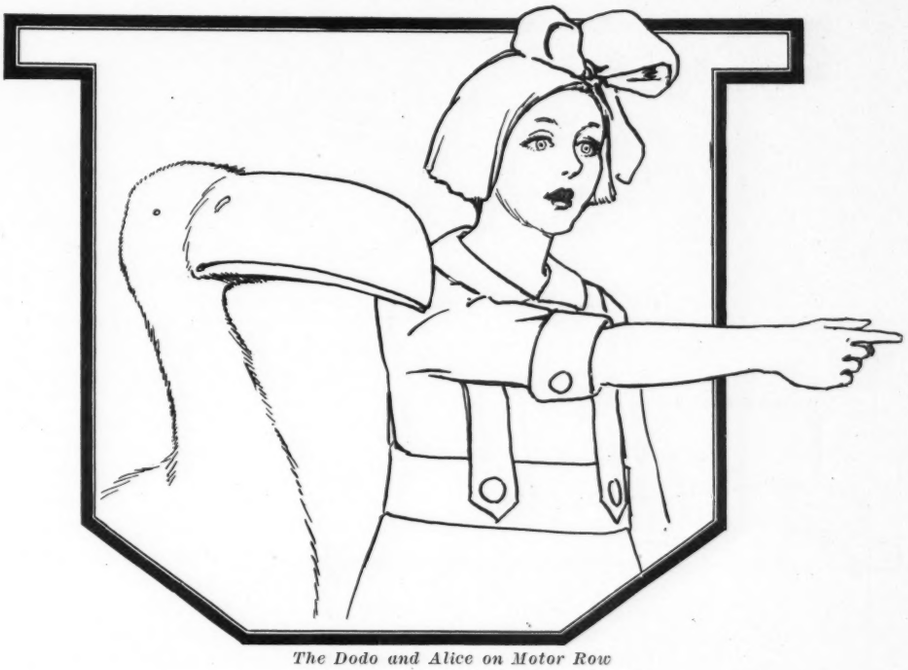
And if he did, think how pleased Alice would be to find a row of shops with all kinds of accessories for her motor journey at the bottom, or foot—whichever it is—of the tunnel.

Just suppose that the Dodo, that kind half-human bird of a critter, did escort her down South Michigan avenue in Chicago, as well as in Wonderland.

"Oh, what funny pillows with handles!" Alice exclaimed. "What are they for?"

"To make the motor seats more comfortable for women," the Dodo replied. "You see, you slip your arms through the straps and the pillow is at your back."

"But I should think——" Alice began.



The Dodo and Alice on Motor Row

"Yes, you should, but you don't," the Dodo interrupted. "If you did, you would know lots of women find the motor seats too deep, and these are to be placed at the back so their feet will touch the floor."

One way of making seats individual

"What do they have that kind of a folding chair for, with leather seat and backrest?" Alice asked, pointing very impolitely into the window of a shop.

"That chair is a chair, of course," the Dodo said rather uncertainly, and naturally, considering his nature.

"Oh, an auto chair," Alice suggested.

"Yes, it ought to, but it doesn't," the Dodo mocked. "It motors instead."

The "ought to" chair

"Ah," Alice said, for once in her life, stumped.

A little later, though, Alice recovered her spirits. She was used to being set on at home and to being sent to bed at ungodly hours of 8 o'clock and so on.

"Why, look at that darling little clock with a mirror sticking out of the top," she cried, stopping suddenly in front of a window and nearly getting run over by a large, important person.

"Darling little nothing," the Dodo grunted. "That's vanity, pure vanity."

"But I don't see——" Alice began.

"Of course you don't," the Dodo scolded. "With such a small mirror, nobody who knows a speedometer from a pedometer would expect to see her face in such a small mirror at this distance."

This hushed Alice, for she had a suspicion this might be rather a slam on herself, as she did not remember exactly whether "speed" is just another name for what the meter registers for "ped," which she understands was used once intsead of a foot.

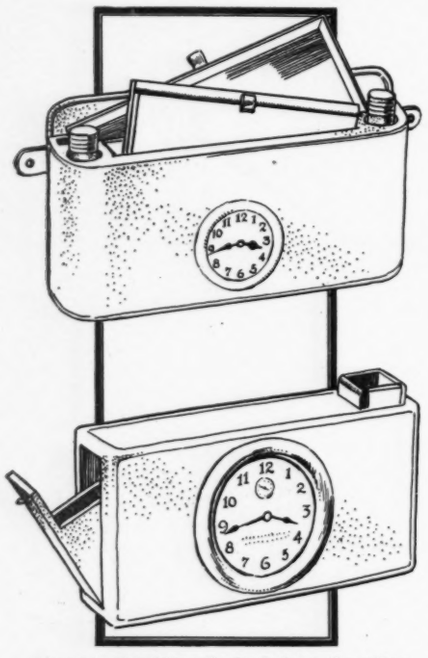
So Alice and the Dodo went on quietly, not saying a word, until finally Alice just couldn't stand it any longer.

"But what do they want with a mirror in a clock?" she demanded.

And the Dodo told her.

It seems Milady likes these little added touches in her car, so the manufacturers made a clock to contain smelling salts, cardcase, mirror and most anything else. One for the men has a cigarette case and matches instead of the feminine articles.

Alice could hardly believe such convenience was. She refused to leave out face



Above is the Alice clock; below, the other offers a cigarette holder

powder, even though the one shown had none. But that is an easy matter, the Dodo explained, in this day of rice papers, especially.

Alice could hardly tear herself away from this window, but finally managed it and looked with disgust into another window at a plain pasteboard box conspicuously displayed.

"How very ordinary!" she exclaimed.

But the Dodo hollered, "Don't stop! Don't stop!" and Alice hurriedly started to move on.

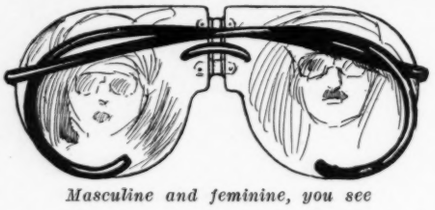
What the Dodo really meant, however, was "Don't stop looking. Look farther." For right near the plain box was another with the contents spread in front of it.

"A luncheon set. What darling spoons," Alice cried as she clasped her hands with rapt pleasure.

"Now you see what happens when you make mistakes," the Dodo preached.

"What happens?" Alice wanted to know.

But the Dodo was getting tired of being so explicit and wanted to ride on the elevated. Besides, he caught sight of some rimless goggles with flexible earpieces and



Masculine and feminine, you see

a hinge at the bridge, and he thought he also could use these.

"How am I going to remember where to get these things?" Alice asked.

"Oh, I'll make a list," the Dodo promised.

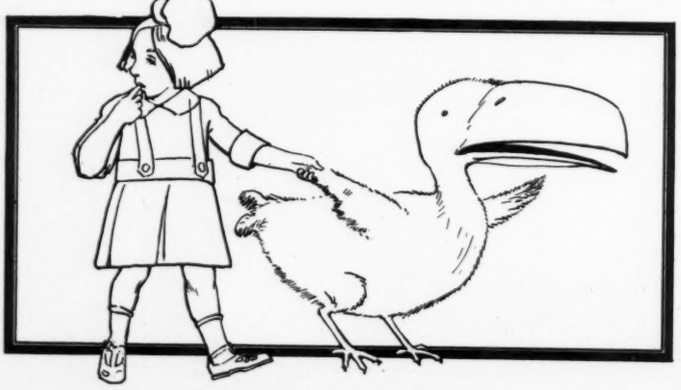
He did, and here it is:

Motor cushion, red, green and brown, $1.25, Fred Allen Auto Supply Co.; folding chair, $1.50, Fred Allen Auto Supply Co.; clock for women, $4.50 and $9, Keyless Auto Clock Co.; clock for men, $15, Keyless Auto Clock Co.; luncheon set of wooden platters and spoons and paper tablecloths, 35 cents, Fred Allen Auto Supply Co.; goggles, $1.25 to $3.75, Fred Allen Auto Supply Co.

THE CAPE RETURNS

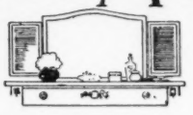
The king is dead! Long live the king! So might one exclaim aloud concerning the tantalizing cape which hangs from the shoulders and swings so enticingly, as if daring the shopper to purchase. A most charming memory is that of a red coat with a red cape which rippled from the shoulders and cascaded down the back of the wearer.

That was several years ago. Today I pick up a fashion sheet, or walk through the aisles of a shop or take part in a conversazione, and every now and then the cape again creeps into notice. Nothing so very ordinary as the overloading of coats with capes, such as was done when the cape was last in vogue, is expected. But the small cape is already here.



The Dodo had a terrible time escorting Alice

Beauty Hints for the Woman Motorist



No. 5

FRECKLES! How many crimes are committed in thy name! Ever since, and even before, the myth of the Indian maiden who bathed in milky fluid and became like the snow, others have tried the magic liquid and its by-products, seeking surcease of sun touches.

It is said persons who perspire freely do not freckle or tan so easily. But motoring does not tend to induce perspiration, except, perhaps, in the case of blowouts and the like, and the motorist is particularly susceptible to the solar rays. The wind in motoring dries up the outer layer of skin, and unless there is additional protection, such as cold cream—lo! the freckle. One is advised to avoid water, especially warm water, on the face for at least an hour before exposure to wind or cold. Rose water and glycerine, though, are not tabooed, for they prevent sunburn and ward off the marauding freckle, which seems to have an affinity for the tip of the nose and the cheek just beneath the eye.

Lactic acid is still the prime constituent of freckle lotions, thus showing the wisdom of the ages from the Indian maiden on down. This acid, you know, is procured from sour milk or whey. The old advice to bathe the face in sour buttermilk is still good inasfar as lactic acid is present. Many combine the glycerine and rose water with the lactic acid, and with success.

Freckles are due to the irregular deposit of pigment forming cells in the skin. Exposure to sunlight stimulates the pigment formation, and freckles are the result. Tan shows a regular distribution of such cells. Pigment cells are more numerous in certain spots, which appear darker when the skin is exposed to stimulants of pigment formation and are the freckles.

If one could avoid sunlight altogether, one could avoid freckles. It is possible to protect your skin against sunlight by cold cream and a good powder. Light summer freckles eventually wear off. Lemon juice, hydrogen of peroxide and glycerine hasten their departure. Never use an application containing corrosive sublimate, however. This is one of the most dangerous poisons and is as much to be shunned as lead in powder is.

The Motor Car Repair Shop

Special Tools for Odd Jobs

THE Hudson Motor Car Co., has issued a pamphlet listing an assortment of tools intended primarily for garage stock to be used in repair of the super-six. Many of these tools, however, are suitable for a variety of cars and we are illustrating a few of them and describing their purpose. The illustrations and descriptions may serve as ideas for garagemen who wish to replenish their tool rooms with useful devices.

1—Piston-ring spreader—This is a convenient tool used to install or take out piston rings and its use will prevent chance of breaking the ring or burring the edges. It may be used on any car.

2—Piston-ring binder — This device is used for compressing rings into the cylinder. It is placed about the piston and rings and the piston is pushed into the cylinder. The binder remains with its lower edge on the top edge of the cylinder, and, of course, drops off when the piston is completely inserted.

3 — Spicer universal companion-flange puller—This puller facilitates the removal of companion flanges on any Spicer universal, which flange is forced onto the gearset mainshaft and rear-axle pinion shaft to insure a perfect fit.

4—Valve-tappet adjusting wrench—The wrench is designed to hook the tappet from the back. The design of the wrench gives more strength than is found in the conventional type. It is particularly applicable to the Hudson because of the lack of clearance between the valve tappet and the tappet-guide clamp.

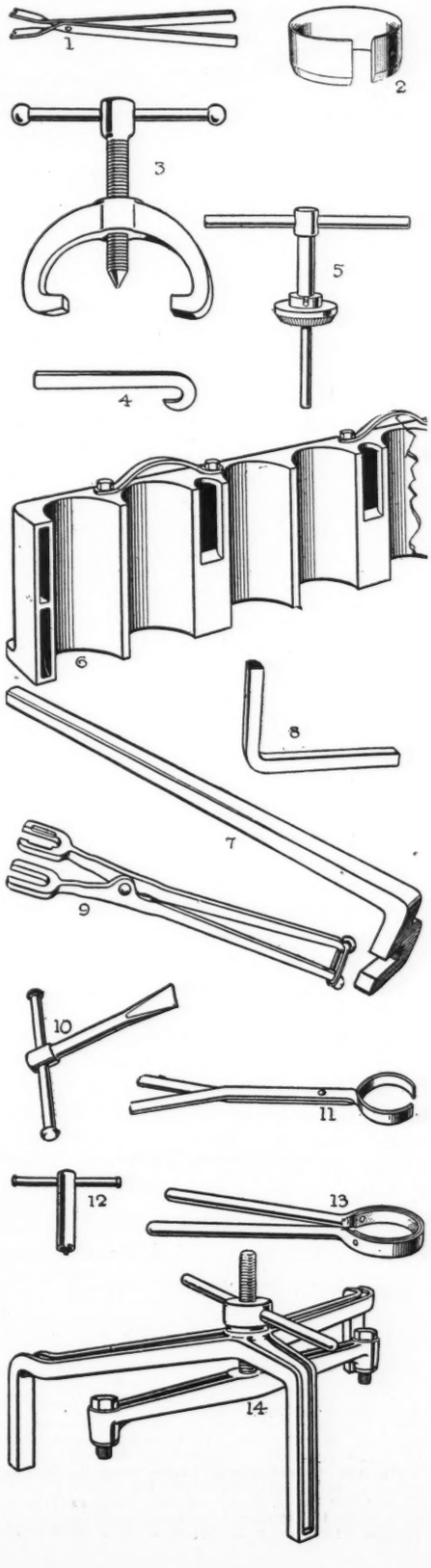
5—Valve-reseating tool—The tool illustrated is easy to operate and is valuable in truing up the valve seats after the motor has seen considerable service.

6—Piston alignment fixture—This device consists of a standard cylinder block cut in half. To use, it is bolted to the crankcase and gives an efficient means of lining up the pistons in reassembling a motor.

7—Connecting-rod bending fork — This may be used in conjunction with the piston alignment fixture for lining up pistons. The slot is slipped over the arm of the connecting rod and the leverage is sufficient to bend the rod any desired amount.

8—Oil reservoir drain plug wrench—This wrench is made of ordinary stock of cold-rolled square steel and is used to remove oil reservoir drain plugs.

9—Valve lifter—This lifter is forged out of machine steel. It is equipped with a slip ring so that, if necessary, the valve spring may be held in a compressed position. It may be used on practically any motor with valves in the side.



10—Cylinder-plate and generator-screw driver—A powerful driver has many uses in any repair shop. The one illustrated is designed particularly for use on valve-tappet covers and generator-field coils, but may be put to a number of other uses where good leverage is required.

11—Radiator outlet hose clamp—This simple tool greatly assists in getting the hose line started back onto the water pump when installing a demountable radiator.

12 — Carbureter packing nut wrench — Gasoline mileage is often reduced because of leakage around the feed regulator of a carbureter. Tightening the gland forces the packing closer around the adjusting sleeve and prevents leaks. This wrench is made for that purpose.

13—Gasoline-tank gauge clamp wrench —Tank gasoline gauges are often held in position by a knurled cap which is tightened securely in place at the factory. Such a tool as the one illustrated is required to remove it.

14—Cylinder-head lifter—In removing a cylinder head it is often the case that some of the studs bind. Necessary variation of manufacturing limits create this condition. The removal of the head may be greatly facilitated by the use of a lifter such as the one illustrated.

Service Speed

From time to time,. the general public is moved to an outburst against the garageman, and while many of the reasons for such outbursts have been eliminated there are still some which are plainly apparent and which must be corrected.

A motorist drove up to a fairly large garage in a small city close to New York. He wanted a 6-volt, 2-candlepower double-contact lamp bulb and he described it in just that way to the garageman.

It took the garageman 12 minutes by the clock to locate the lamp bulb. He had first to locate his stock of lamp bulbs. They were piled on a shelf behind a row of cans of metal polish. Then he had to go over all the various boxes of bulbs to find the particular box with this size lamps in it. This took 10 minutes.

In the meantime, the motorist was becoming more and more impatient. It was evident that he was in a hurry. Yet, here he was waiting while the garageman wasted his time pawing over his stock to make a 25-cent sale. The garageman made a 25-cent sale—eventually.

The Readers' Clearing House

EXPLANATION OF HOTCHKISS DRIVE

Its Use Eliminates Need of Torsion Tube or Radius Rods

TALLULA, Ill.—Editor Motor Age—Will Motor Age please give diagram and describe the Hotchkiss drive? What is gained by using this kind of drive?

2—I have a Moon six 30 on which the brakes heat after a few miles. How can I loosen them so that they will still be effective and not heat?

3—Show a diagram of the oil paddle or marker in a Continental motor and how high the oil should be carried on this.—Geo. Foster.

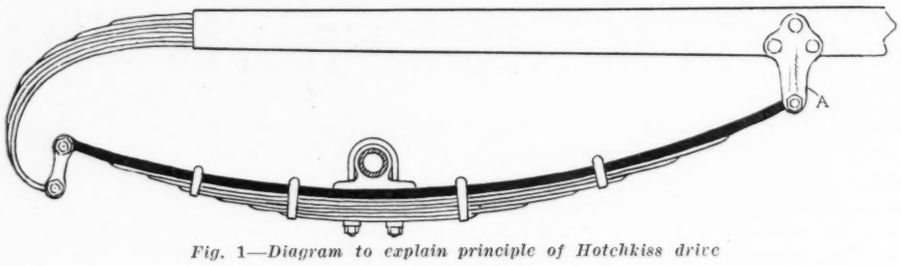


Fig. 1—Diagram to explain principle of Hotchkiss drive

1—Refer to Fig. 1. You will note that the main leaf, in dark color, is heavier than the other leaves of the rear spring. The spring is also firmly anchored to the frame at the point A. The Hotchkiss drive serves the same purpose as a torsion tube or torsion rods, namely, overcomes the tendency of the rear axle to move forward or backward relative to the frame of the car. Torsion tubes and radius rods take care of this torque by locking the axle position with the frame. Hotchkiss drive holds the axle in place through the strengthened main leaf in each of the rear springs, thus eliminating several heavy parts.

2—Probably the releasing springs are weakened or broken. Replace these springs and the brakes should function properly.

3—Give us the model of motor of what car it is used in and we will gladly explain and illustrate the oil gauge.

R. P. M. OF HAYNES TWELVE AND SIX

Six Develops 52 H. P. at 3,400 R. P. M. No Test Made of Twelve

Benton, Wis.—Editor Motor Age—What is the highest R. P. M. power developed and speed of the Haynes twelve and six? Publish power curve of both.

2—What is the gear ratios of both above models?—Harry Allen.

1—Information from the factory states that the highest r. p. m. of the Haynes light twelve is 4,800 and of the light six, 3,400. The maximum power of the six is 52 horsepower at 2,100 r. p. m. As yet, the factory has not a dynamometer of sufficient capacity for measuring the power of the twelve. There are no power curves available.

2—The gear ratio is optional, 4 1/13 or $4\frac{5}{12}$ to 1 on both the six and twelve.

CYLINDERS ALWAYS OVEROILED

Several Reasons Why an Engine Will Smoke and Foul

Salem, Ill.—Editor Motor Age—I have an Allen car model 37 and it has always used too much cylinder oil. I recently had non-leaking packing rings applied, one in each piston, and a new set of rings applied, although the old rings were good and cylinders are not worn a particle and the tool marks are not defaced.

I have tried various kinds of oil, but get no results. Can Motor Age advise a remedy for the oil getting by the packing rings and fouling spark plugs and valves?—C. W. Hyde.

It is possible that the cylinders have been worn out of round or that the pistons are a sloppy fit in the cylinders. A good mechanic should be able to micrometer the pistons and cylinders and determine whether this is the trouble. If the cylinders are in good shape and the pistons are a sloppy fit, the remedy is to fit oversize pistons. If the cylinders are scored to such an extent that the leakage you describe occurs, the only remedy is reboring of the cylinders and fitting of new pistons.

QUESTIONS REGARDING MERCER

Ignition, Make of Carbureter, Cam and Magneto Timing

Milwaukee, Wis.—Editor Motor Age—What ignition system is used on the Mercer car latest model?

2—What carbureter and what model is used?

3—How are the valves timed on the Mercer?

4—How is the ignition system timed?

5—What is the price of the Mercer car?

6—Kindly publish a list of reasons that cause a knock in a motor.—C. Kisek.

1—Ignition is by Bosch model DU-4 magneto.

2—Zenith.

3—Valve timing is conventional in the Mercer motor. The intake valve starts to open in each cylinder when the piston is approximately 12 degrees below top dead center.

4—Conventional Bosch timing. The ignition point for a certain cylinder just starts to break when the piston in that cylinder is at top dead center, the spark being fully retarded.

5—Raceabout, $2,750; runabout, $2,900; sporting and touring, $3,000.

6—Worn crankshaft bearings, worn connecting-rod bearings, worn wrist-pin bearings, pistons loose in the cylinders, broken piston rings, pre-ignition caused by carbon deposits in cylinder head, spark advanced too far, too rich a mixture, scored cylinders, or loose motor supports.

OLD CAR HAS LOST ITS SPEED

Counter Clockwise-Operating Oakland May Have Seen Its Best Days

Washington C. H., O.—Editor Motor Age—I have a 1909 Oakland car which has not performed properly since it was overhauled in the spring. This motor is a left-hand motor and has 2½ inches offset to the pistons. Bore and stroke 4½ by 5, rated horsepower 40. Has been fitted with leakproof rings and seems to run about as usual, except that where I could formerly do 60 miles per hour I can now get no more than 35. Kindly inform me as to when the valves should open and when the spark should occur as regards the piston travel. Should the spark be set so that there will be a kick when the motor is cranked with the spark advanced? Motor is fitted with a Splitdorf magneto, Pfannstiel coil and Stromberg carbureter.—E. E. Bush.

You have a very old car and cannot expect it to have the vitality that it did in its prime. The intake valve in this motor should start to open when the valve is about 12 degrees below top dead center. An easy way to determine whether the valves are properly timed is to remove the spark plug from a cylinder, turn the motor over until the piston is at top dead center, then drop the piston down $\frac{3}{16}$ inch. This can be done by inserting a narrow rule through the plug hole onto the top of the piston. At this point the intake valve should start to open. The spark should be set so that the motor will kick with the spark lever advanced.

GEARSET POSITION WHEN COASTING

Water May Boil in Radiator Without Materially Damaging Motor

Madisonville, O.—Editor Motor Age—I have a King 8 five-passenger car. When going down long, steep hills what method gives least strain and wear on motor? Some say put in first or second speed and some say keep in high, turn off ignition, keep clutch in and let coast, using foot brake so as to go down slowly.

When the water boils in the cooling system is it injurious to the motor?—A Subscriber.

1—This subject was thoroughly thrashed out on page 39 of the August 31 issue of Motor Age.

2—Not necessarily, if there is a good circulation and plenty of water. A more efficient motor is one in which the water is maintained slightly below the boiling point.

Adjusting Camshaft Chain

Hearne, Tex.—Editor Motor Age—I have a Lozier type 84, 1914, on which the chain that drives the camshaft and magneto shaft is loose and noisy. Kindly advise me if there is any way to tighten this and get rid of noise, without putting in new chains.—Roy O. Ely.

Remove the cover from the chain compartment. Embodied in the cover will be found a chain adjusting pad which can be set to take up whatever slack exists in the chain.

STROMBERG ADJUSTMENT ON KISSEL

Weight and Gear Ratio of Hundred Point Six

Zion City, Ill.—Editor Motor Age—Explain the different adjustments of a model HB No. 2 Stromberg carbureter on a Kissel car.

2—Explain the action of the high-speed air valve. The spring has been stretched and the front level changed, so kindly give every setting and adjustment.

3—What is the weight of the 100-point Kis-

sel Six ready for the road? Ans.—2,400 pounds.

4—What should be the gasoline consumption?

5—What is the gear ratio?

6—How many r. p. m. is the motor turning when the car is going 10 miles per hour?—George W. Shaw.

1-2—See answers to questions of Fred W. Leach in these pages.

4—16 to 18 miles per gallon.

5—4.58 to 1.

6—481.

6-VOLT HORN ON 12-VOLT SYSTEM

Resistance Coil May Be Inserted Between Switch and Horn

Cincinnati, O.—Editor Motor Age—I have a Dodge which uses a 12-volt electric system to which I have attached a regular L Klaxton which I understand is intended for 6-volts only. This curent seems to be too strong. Suggest a resistance I could make or purchase that would reduce the current to 6-volt so the Klaxon would operate normally, as it is now the Klaxon does not operate correctly.—C. W. Haymeyer.

A resistance coil such as is used for dimming headlights should perform the necessary function if inserted between the switch and horn. If the resistance coil gives too great a reduction the current supply may be increased by removing one loop of the coil at a time until the proper resistance is created and then fastening the new end. Such a coil should be found in any motor car electrical supply store. A voltmeter will let you know whether the current has been properly reduced.

CASTOR OIL AS A LUBRICANT

Prohibitive Cost Offsets Minor Superiority Over Ordinary Oils

Athens, Tex.—Editor Motor Age—Kindly advise your opinion as to the worth of castor oil as a lubricant for motor cars. I have been told that it was the best lubricant that anyone could use. If it is better than mineral oils, advise me what one should mix with it to use it in the crankcase, also in the transmission and differential. I have a 1912 Pathfinder and I want to use the castor oil if it will give better service and cause the least wear.—A. S. Ferrell.

Castor oil is an excellent lubricant for motors inasmuch as its purity reduces carbon deposits and its flash point and other lubricating features are very suitable to a gasoline motor, however, its cost is such that its use is not practical. Gas engine oils of the best grade so nearly approach the value of castor that the latter is not worth the much higher cost. The fumes of castor are thoroughly unpleasant, if you consider the pedestrians whom you pass.

RUNNING MOTOR AT 600 R. P. M.

Mechanical Tire Pump Instructions Prove Misleading to Reader

New Castle, Pa.—Editor Motor Age—Should one cut out the ignition when using the motor as a brake, or does it make any difference?

2—Have installed a motor-driven tire pump on my Hudson 6-40 and directions say to run motor at 600 r. p. m. How is one to know when motor is running at this speed?—Mrs. M. Lane.

1—The motor, with ignition on, is valuable as a brake only to the speed where the motor idles. At that point, of course, the motor gives power to the rear wheels instead of braking them. If you must use your motor for a brake and want the most positive results, shut off the ignition. The ignition will not be harmed one way or another.

2—Directions do not mean that the motor has to run at exactly this speed. The pump will work most efficiently if this speed is approximated. Set your motor so that it sounds about like it does when your car is running 15 or 20 miles an hour; then run your pump.

CEDRINO KILLED IN MAY, 1908

Louis Strang Won Briarcliff Road Race In Isotta Franchini in 1908

Dallas, Tex.—Editor Motor Age—Is the Pimlico track located at Washington, D. C., and was Cedrino, the famous Italian driver, killed on it? Give the date of his death.

2—Did Louis Strang win a Briarcliff road race in an Isotta Franchini, and in what year?

3—Was this Isotta the same car in which Lytle finished second in the 1908 Vanderbilt?

4—In what year did Joe Tracy in a Locomobile win the Vanderbilt, if ever?—J. E. Armitage.

1—The Pimlico track is located at Baltimore. Cedrino was killed there May 28, 1908.

2—Yes, in 1908.

3—Yes.

4—Tracy did not win a Vanderbilt. He ran third in the 1905 event.

Non-Leaking Rings in Old Buick

Arcola, Ill.—Editor Motor Age—I have a 1913 model Buick roadster run abount 9,400 miles, on which I desire to increase the compression. What kind of non-leaking rings do you think would be best for this motor? Also, should I put in three in each cylinder, or will one be sufficient? The motor is model 30, 4 by 4.—G. Fred Munson.

There are many well-designed non-leaking rings on the market and we cannot recommend any particular one. One in each piston will help to raise the compression, but, of course, a complete set will give even better results.

Motor Jerks at Low Speed

Basalt, Ida.—Editor Motor Age—I have a 1917 model Studebaker, and when I run about 5 miles or under with the intermediate or high speed engaged the car seems to jerk. It has been this way ever since it came out of the shop. It never bothers with low speed or when running over 5 miles per hour. Would be pleased if you could tell me what is the matter. —Ralph Kingsford.

We cannot direct you to the trouble from the meager description you give us. Possibly it is in the carbureter adjustment; possibly in the valve or ignition timing. Put the matter before the dealer who sold you the car.

Adjusting Planetary Gearset

Chadwick, Ill.—Editor Motor Age—I have a two-cylinder Jackson equipped with a planetary transmission which works nicely in reverse, but will not take hold in low or high. Have taken it down and it looks all right, except the fiber washers in the transmission which may be cause of it not taking hold forward. What is the trouble?—F. K. Zugschwerdt.

Your description of the condition of the gearset is too vague to give us an idea of what the trouble may be. Possibly the friction bands need replacement and possibly it is merely a matter of adjustment. If you do not know how to adjust the low and high speeds let us know and we will give you a method.

Operation of New Enger

Prophetstown, Ill.—Editor Motor Age—Give the working principle of the Enger twin six in regard to cutting off six cylinders. Is this an ignition and compression cut off? What cylinders are cut off? What oiling system is used?—A. G. T.

A complete description of the Enger appears in this week's issue of Motor Age. Briefly, the operating principle is to cut off the gas supply into one block of cylinders with a butterfly valve in the manifold and with the same operation to lift the cams in that block of cylinders so that all compression is released.

Aluminum Piston Formula

Council Bluffs, Ia.—Editor Motor Age—Can Motor Age furnish a formula for aluminum castings suitable for motor car pistons?—A. L. Sprague.

Aluminum, 80 per cent; zinc, 15 per cent; copper, between 2 and 3 per cent; manganese, not to exceed .40 per cent. The aluminum should not run less than 80 and the zinc not over 15.

Friction Trouble in Imp

Pacific Beach, Cal.—Editor Motor Age—I have a 1914 two-cylinder Imp friction-drive cyclecar. The friction drive causes much trouble. How can this be remedied? Could a motorcycle transmission be used, and if so, where can it be purchased?—John A. Weed.

A stronger tension spring or new lining on the driving wheel should give sufficient friction. A motorcycle gearset should be strong enough to stand the driving strain and one could be applied to your car, but probably the expense would be prohibitive.

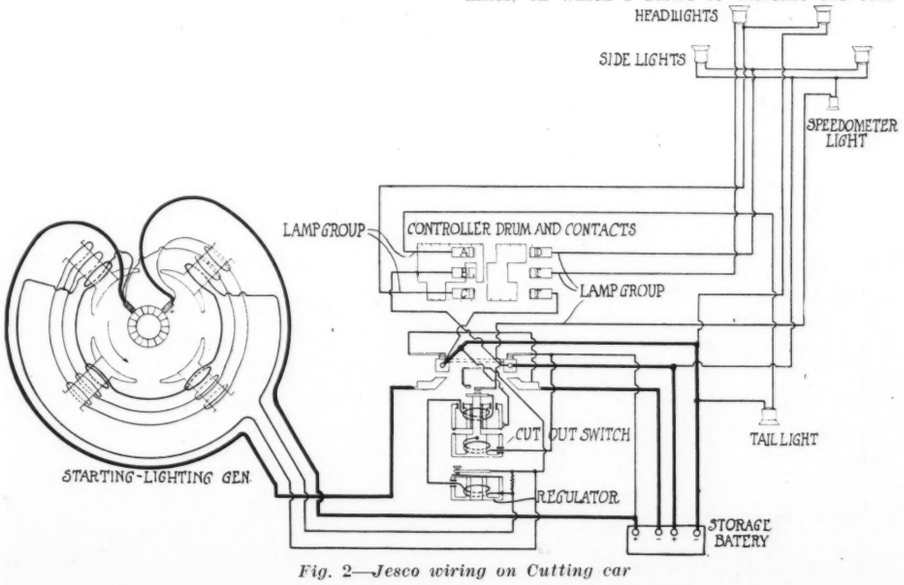


Fig. 2—Jesco wiring on Cutting car

We know of no place such a gearset could be purchased unless from the motorcycle manufacturers themselves.

BRAKING WITH MOTOR UP AGAIN

Reader Cites Extreme Cases in an Effort to Prove a Point

Baltimore—Editor Motor Age—Thanks in advance if you give space to a flat contradiction of part of the article, "Do Not Brake With Clutch Engaged," in the August 31 issue of Motor Age.

1—Getting to the facts briefly, consider that a car is descending a hill at a speed of, say, 18 miles; the gear is shifted to intermediate, but clutch is thrown out and throttle closed, motor running at idling speed. Now, let the clutch come in swiftly, without opening throttle. Instantly a terrific strain is thrown on the entire drive line, crank shaft to tires.

2—But, suppose that at the very instant of letting the clutch come in, both brakes are applied powerfully. Immediately the strain on all parts (except the brakes and their connections) is decreased in direct ratio to the braking force. Why? Because the motor, fighting compression, no longer has the terrific thrust of the car's full momentum, multiplied by the gear reductions, applied reversely, in gear box and rear axle. The momentum is decreased as soon as the brake bands bite the drums; and this fact holds good whether Hotchkiss drive, radius rods or torque tube takes the thrust.

3—Careful consideration of the foregoing will show that application of brakes while clutch is engaged eases the strain which the motor and entire driving mechanism has to bear when the motor is alone acting as check to momentum. The hypothetical case mentioned is extreme and used purely for illustration; in practice, the fact remains that the applied brakes divide with the motor the work of overcoming the car's momentum.

4—Your article declares that "a sudden application of the brakes applied when the clutch is engaged and the motor fighting compression is going to lash against the drive gear, universals, gearset and the motor itself with a strain that is far more severe than even quick application of power by opening the throttle wide."

5—This is absolutely untrue. In the hypothetical case I have used, sudden letting in of the clutch brings such a strain. This must be utterly clear to you upon the least consideration. Likewise it is patent that the use of the brakes must lessen that strain.

6—In a driving experience which dates back to 1903, it has been my plan to use brakes and engine evenly to check the car's speed until the speed reaches a point where the engine, if ignition be on, will pull against the brakes; at such point I throw out the clutch. This makes an ideal emergency stop, provided the man at the wheel is thoroughly trained through long practice.

7—The sole objection to braking with the engine is that, with throttle closed and suction thereby increased, there is strong tendency for the pistons to draw up oil past the rings; and this can be overcome to some extent by partly opening the throttle. But even excess of oil is preferable to fast wear on the brake linings.—Frank A. Ward.

1—You are dodging the issue. We never considered the use of intermediate in the arguments advanced. Furthermore, this subject of motor speed in ratio to driveshaft speed was discussed by the writer on page 39 of the August 31 issue, the same article to which you refer.

2—You still have your gears in intermediate. Who is clever enough to apply the brakes with a pressure that will slack the wheels to correspond exactly with the deceleration of the motor?

3—The motor and brakes divide the work of reducing the car speed, but the average driver is not capable of judging braking speed in proportion to the deceleration of the motor. We are writing for the average driver.

4-5—The rear wheels may be locked so that they will not revolve with a quick application of the brakes. The motor will not come to an instant stop or even approach this condition when the throttle is released. Then, why is not the motor fighting against the rear wheels? It is.

6—Probably a majority of the readers of Motor Age have not driven cars over two or three years. How many of them are going to look for the relative speeds which you describe?

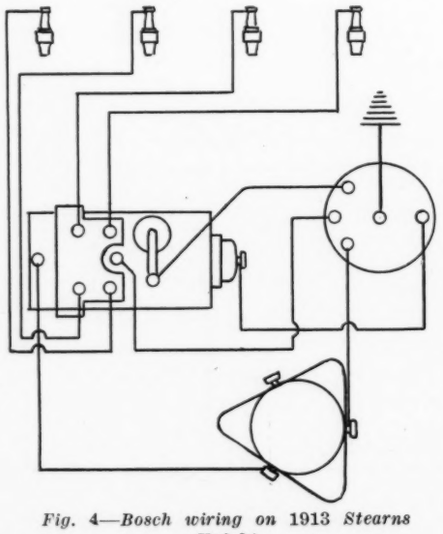


Fig. 4—Bosch wiring on 1913 Stearns Knight

Fig. 3—Novel method of repairing Ford rear axle

Inquiries Received and Communications Answered

Geo. Foster	Tallula, Ill.
Harry Allen	Benton, Wis.
C. W. Hyde	Salem, Ill.
C. Kisek	Milwaukee, Wis.
E. E. Bush	Washington C. H., O.
A Subscriber	Madisonville, O.
George W. Shaw	Zion City, Ill.
Roy O. Ely	Hearne, Tex.
Mrs. M. Lane	Newcastle, Pa.
Ralph Kingsford	Basalt, Ida.
A. G. T.	Prophetstown, Ill.
C. W. Haymeyer	Cincinnati, O.
J. E. Armitage	Dallas, Tex.
R. W. Daggett, Jr	Madison, Wis.
A. S. Ferrell	Athens, Tex.
F. K. Zugschwerdt	Chadwick, Ill.
John A. Weed	Pacific Beach, Cal.
G. Fred Munson	Arcola, Ill.
A. L. Sprague	Council Bluffs, Ia.
G. B. Kelly	Dixie, Wash.
Frank A. Ward	Baltimore, Md.
G. T. Hewitt	Regina, Sask.
T. Smith	Chicago
J. W. Monroe	Sioux City, Ia.
P. M. Peterson	Erskine, Minn.

No communication not signed by the inquirer's full name and address will be answered in this department.

7—With the average driver the objection to braking with the engine inflicts an undue strain in the working parts, considering sudden application of brakes with the momentum of the motor where it usually is when the brakes are applied. As for sucking oil, the short time that the motor takes in idling is not going to draw enough oil into the cylinders to coat the head of a pin. Again an extreme case might apply, when a car is coasting a long hill with the ignition off and the clutch engaged. Then some oil will be drawn up. In an extreme case a man may fall to the ground from a five-story window and, providing the conditions are just right, something to break his fall, or a hayload to land on, he will live. Ordinarily he would die. It would be hard to find a man who would jump five stories on the supposition that he would be uninjured.

Nyberg No Longer Made

Dixie, Wash.—Editor Motor Age—Is the Nyberg still manufactured?

2—What are its motor dimensions and number of cylinders?

3—What was its maximum speed per hour?—G. B. Kelly.

1—No.

2—Nyberg made a variety of fours and sixes in 1911-12-13-14. If you can advise us of the model we can give you the motor specifications.

3—Depending on the model.

Novel Ford Axle Repair

Regina, Sask.—Editor Motor Age—We are inclosing herewith a snapshot of one of our mechanics using an original plan of reinforcing a Ford drive housing by inserting an old or broken housing inside the new repair part. The plan has proven very successful having been used on trucks that have since run over six months and no breakage reported yet.—G. T. Hewitt.

[Illustrated in Fig. 3.]

Bosch Wiring on Stearns

Chicago—Editor Motor Age—Kindly publish in Motor Age wiring diagram of 1913 Stearns-Knight, Bosch dual system.—T. Smith.

A wiring diagram of the Bosch system alone is shown in Fig. 4. This car was equipped with a Gray & Davis starting and lighting system.

Jesco System on Cutting

Sioux City, Ia.—Editor Motor Age—Kindly publish a diagram showing the Jesco starter system, using a 16-volt storage battery as used on the 1913-1914 Cutting car.—J. W. Monroe.

The diagram you ask for is published in Fig. 2.

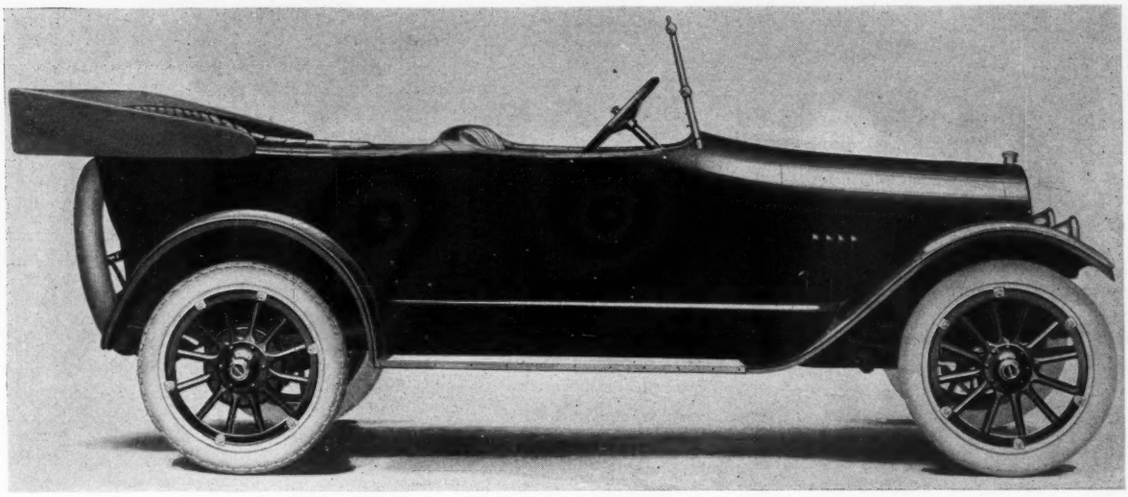
Seat-Cover Cleaner

Austin, Tex.—Editor Motor Age—Kindly publish a receipt for cleaning seat covers.—Louis Weiss.

There are several upholstery cleaners on the market which are soapy compositions which also serve well as cleaners for seat covers. Probably the simplest recipe would be to use a good grade non-alkali soap and warm water. Seat covers are water resisting and good ones will not shrink. If they are removed, they may be cleaned on a scrubbing board without ill effects.

Paterson Bodies Wider and Longer

Hotchkiss Drive Is One of Several Mechanical Changes

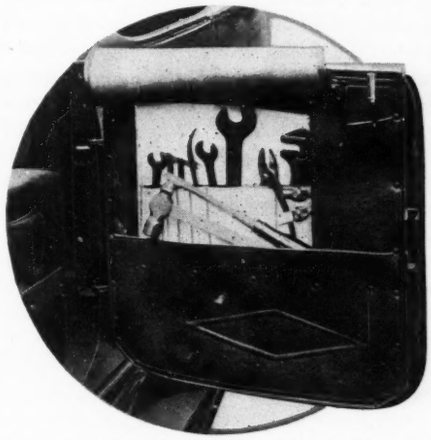


Touring body of 1917 Paterson, which is wider and longer than its predecessor

THE 1917 Paterson chassis which is the product of the W. A. Paterson Co., Flint, Mich., has two important mechanical changes as compared with the 1916 model, and to it will be fitted a four-passenger roadster body in addition to a new design of touring car body with the popular double cowl effect. The offering of one of the so-called sociable types of roadster or close-coupled bodies is a new thing with Paterson, heretofore only the touring car body being offered. The price is set at $1,065 with the touring car body.

Mechanically, the only changes in the chassis, which is powered with a six-cylinder Continental motor, are the adoption of a Hess floating axle instead of the make that was fitted last season, and the use of the Hotchkiss type of drive, whereby the drive shaft back from the gearbox is open and fitted with two universal joints, and the drive and torque are taken through the rear springs, the main leaves of which are made strong enough to take on these added duties. Heretofore an enclosed drive shaft with a single universal at the front end has been used, the newer construction being lighter and doubtless much more efficient as applied.

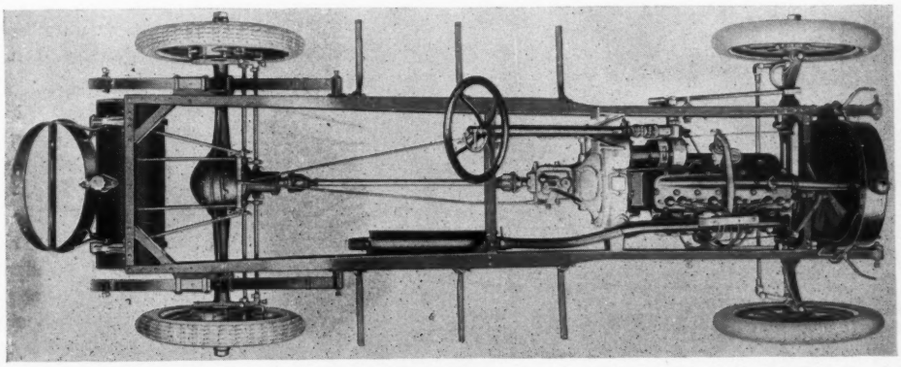
In the body, perhaps the most notable differences are the new lines and the wider and longer dimensions which add to the roominess of the vehicle. At the back of the front seat the double cowl idea has been meritoriously worked out in conformity with the general lines of the car, and the straightness of the lines has been accentuated by raising the radiator and hood 1½ to 2 inches. As an added touch of modernity the windshield has been given a slight slant, the mistake of making the incline too great not being committed. To give more leg room for the front seat passengers, the front seat has been moved back a few inches, and to further add to the car's comfort and good looks, the upholstery is of the type in which there are parallel plaits instead of the tufted form. Auxiliary seats to fit the tonneau can be furnished if desired, thus giving ample room for seven should the purchaser wish to convert the car into a vehicle of larger capacity.



Complete set of tools in door besides driver's seat on new Paterson

It would scarcely seem necessary to go into a detailed description of the 3¼-inch by 4½-inch Continental powerplant, since it is in accord with regular design of this make. It might be said, however, that the cylinders and upper half of the crankshaft are cast in one piece, with the cylinder head detachable as a unit. Valves, manifold, water pump and electric unit are all positioned on the right, which leaves the left side exceptionally clean. In fact, nothing is carried on this side with the exception of the carbureter, this bolting directly to the casting, well up in the center. Distribution of the incoming gases to the several intake ports is done within the casting itself, affording excellent heating of the incoming gases and eliminating the necessity for an elaborate jacket arrangement for the carbureter.

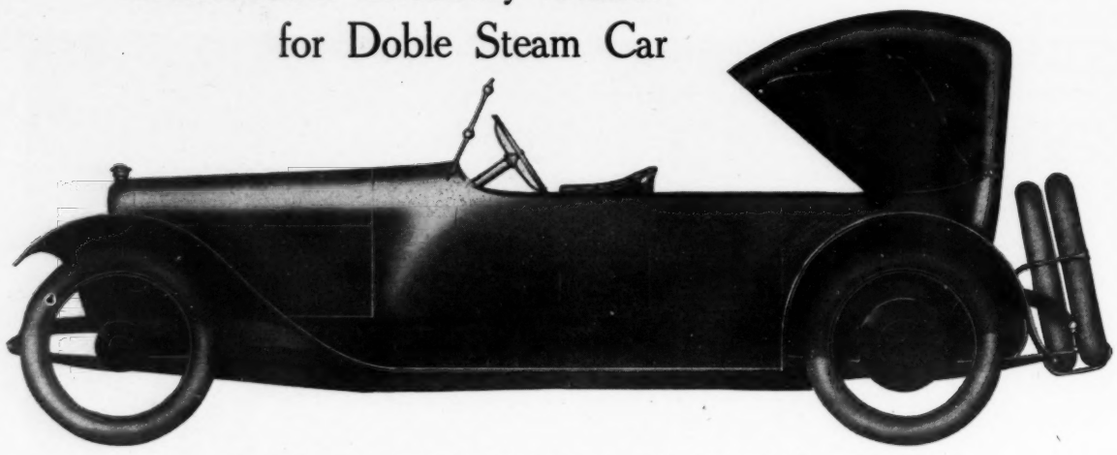
The equipment is, as usual, complete.



Chassis of new Paterson in which Hotchkiss drive is now evident. There are two universals instead of one as previously

15 Miles on a Gallon of Kerosene

Remarkable Economy Claims for Doble Steam Car



A Holbrook body is used on Doble steam car, which will be in high-priced class

ABNER Doble, who for a number of years has been experimenting with steam automobiles, has appeared in Detroit at the psychological moment with a newer design of vehicle that adheres to the same general principles as the first steam car he brought out about 2 years ago, but embodies a number of later ideas that bring it strictly up to date. At a time when gas line is very high, and the public is clamoring for silent and flexible vehicles, Doble has been able to get the ear of the engineering fraternity here, and he has found everyone in a receptive mood. It sounds well to the Detroiters to know that a vehicle has been developed that is claimed to give 15 miles per gallon of kerosene when run at an average speed of 30 miles per hour, travels 8,000 miles on a gallon of lubricating oil and requires but one filling of the 20-gallon water tank for 1,200 to 1,400 miles of running.

Holbrook Bodies to Be Used

A company has been organized here to be known as the General Engineering Co., with Doble as one of the officers, and this organization is to build a limited number of the steam vehicles, with bodies designed by Holbrook. These cars will be in the high-priced class and excellently appointed and constructed in every particular, it is stated. In addition, the concern plans to license manufacturers to use the Doble system of steam propulsion, which, by the way, can be constructed of a size to meet the requirements of any chassis.

Vertical Tube Generator

Briefly, the Doble steam car consists of a vertical-tube steam generator placed under the hood where the engine would be in a gasoline car, and under this is placed a combustion chamber lined with a refractory material. Kerosene is introduced here, and ignited by a point, electrically heated to sufficient temperature to ignite the kerosene. The steam is then passed back to a two-cylinder engine mounted in unit with the rear axle. A condenser is utilized, so that the steam is re-converted into water and used over again. The kerosene tank is mounted at the rear of the chassis, just as a gasoline reservoir would be carried.

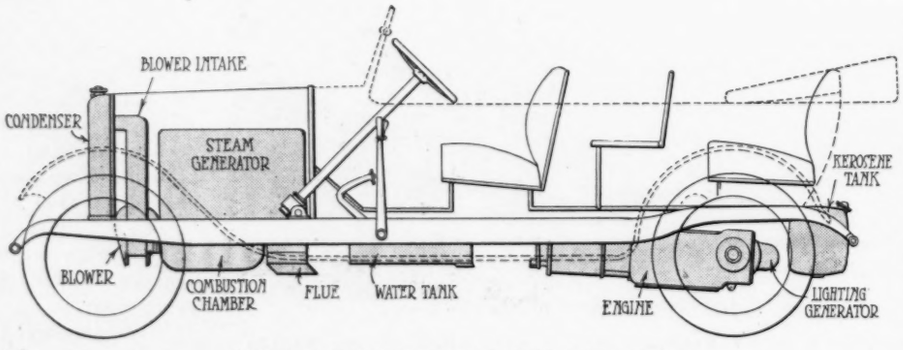
Aside from the advantage of not requiring a new supply of water at frequent intervals, the Doble car starts practically instantaneously although steam is not already up. All that is necessary to start and run the car is to turn the switch to the running position. This heats the igniter point and ignites the fuel. Then the throttle is opened and the machine starts immediately. In case the car has been inactive for several days, so that everything is cold, it takes about 1½ minutes to start, but after a wait of a few hours, such as over night, the machine can be started at once. In case the electric switch is left in the running position, the steam pressure remains at the normal point continuously.

No clutch nor gearset is used. Power is transmitted to the rear axle by spur gears, a forty-seven-toothed gear on the engine crankshaft and a forty-nine-toothed gear on the differential. That reduction gears are not required was demonstrated by the fact that the engine had more power than was needed to spin the wheels from rest on a dry pavement.

Generator Construction

The generator is of the water tube style, consisting primarily of a number of identical sections placed in an insulated casing. These sections consist of two horizontal headers connected by sixteen vertical tubes. The headers and tubes are made from cold drawn seamless steel tubing, and the tubes are welded to the headers by the autogenous acetylene process, making the section of one piece of steel. The tube is swaged down to about ⅜ inch at the weld, thus reducing the amount of welding required and also making the weld stronger than if it were the full diameter of the tube.

About one-third of the sections are used as the economizer, and the remaining sections form the evaporating part of the generator. The water enters the generator through the lower headers of the economizer and rises through the tubes to the top headers, becoming heated on its way by the gases that have passed through the evaporator portion of the generator. From the top headers of the economizer the water is fed through a pipe to the bottom headers of the evaporator



Arrangement of components in Doble steam car

sections. The water level is maintained automatically about half way up the generator. The steam rises through the upper part of the tubes, becoming superheated on the way, and goes out through the upper headers into the steam pipe where it is led to the engine. The amount of steam passing is regulated by a throttle valve. The tubes in the generator are nested in a close, regular manner, so as to efficiently abstract the heat units from the gases.

The combustion takes place in a combustion chamber of efficient design, made of a special refractory material, which attains a very high temperature, and insures efficient combustion, by heating the gases before they burn, and by catalytic action. The gases rise past the tubes of the evaporator portion, and are then passed over a bridge wall and down past the tubes of the economizer portion, where the remaining heat units are abstracted by the relatively cool water entering the generator by way of the economizer.

Internal Combustion Design

Thus, the fuel is burned by means of a system that eliminates any attention or labor on the part of the driver, and reduces the time necessary to start the car from cold by the amount formerly necessary to properly pre-heat the vaporizer. This has been accomplished by taking a few pointers from internal combustion motor design, broadly following the same idea whereby air is made to pass through a device which mixes into it a correct amount of fuel, then this mixture is led into the combustion chamber described above in connection with the generator, where it is ignited by means of electricity. In order to cause the air to flow, a small blower is used, and is driven by an electric motor, such as is used in vacuum cleaners. This blower forces air through the carbureter.

The steam is used in a simple, uni-flow, double-acting, two-cylinder, locomotive-type steam engine, with a bore of 5 inches and a stroke of 4 inches. This type of steam engine is one in which the steam travels through it in one direction only; that is, it goes from the cylinder head to the center exhaust port. The slide valves are on top of the cylinders, and are actuated by a Joy valve-gear. This gear dispenses with the need for eccentrics, thus making a one-piece crankshaft possible, and gives a superior steam distribution. The gear also reverses the engine without the need of extra devices. The cut-off can be set at any desired point, three being the usual number of cut-offs provided. In operation three-quarters cut-off is used for starting or heavy going, three-eighths for ordinary running and accelerating and one-eighth for high speed and high economy work. The valves are made in two pieces so that they can lift in slow running whenever the compression exceeds the steam-chest pressure. This makes a smooth engine at all speeds and also allows a high compression at all higher speeds and steam-chest pressures.

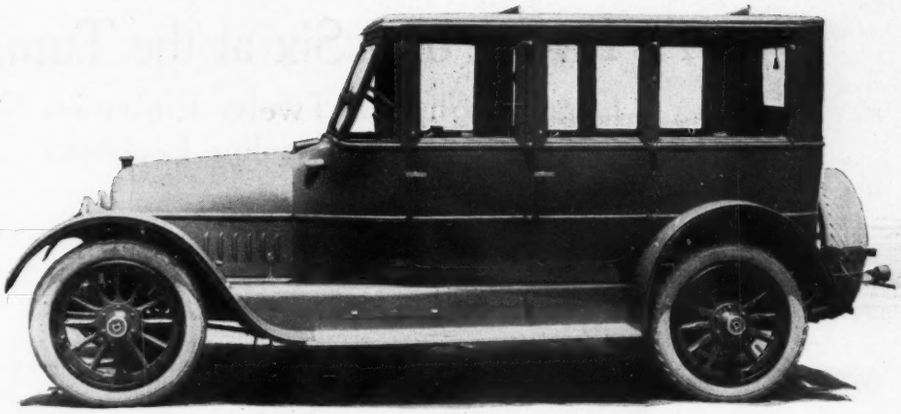
Piston-rods pass through special solid cast-iron glands, which are made such good fits on the piston-rod that no steam can blow by. Due to the long bearing surface there is practically no wear, and never any need for repacking, it is said.

The crankcase is a well-proportioned aluminum casting, and contains the entire moving parts of the engine except the pistons and valves. The differential is also contained in the crankcase, and the taper-tubes of the axle bolt directly to it. Thus the engine and rear axle are one unit.

The main bearings, and the big end connecting-rod bearings are annular roller, and are of such proportions that no wear should occur during the natural life of the car. All of the other bearings such as the wrist-pins and valve-gear bearings are hardened steel, running in hardened-steel bushings.

Due to the slow speed of the engine, it being geared 1 to 1 with the axle, and to the steel bearings, no forced-feed oiling system is necessary or even desirable, and, as the casing is oil tight, as the oil is kept comparatively cool, and as no carbon, water or gasoline can contaminate the oil, the oil supply in the crankcase lasts for several seasons. Naturally, all parts of the axle are oiled from this same bath.

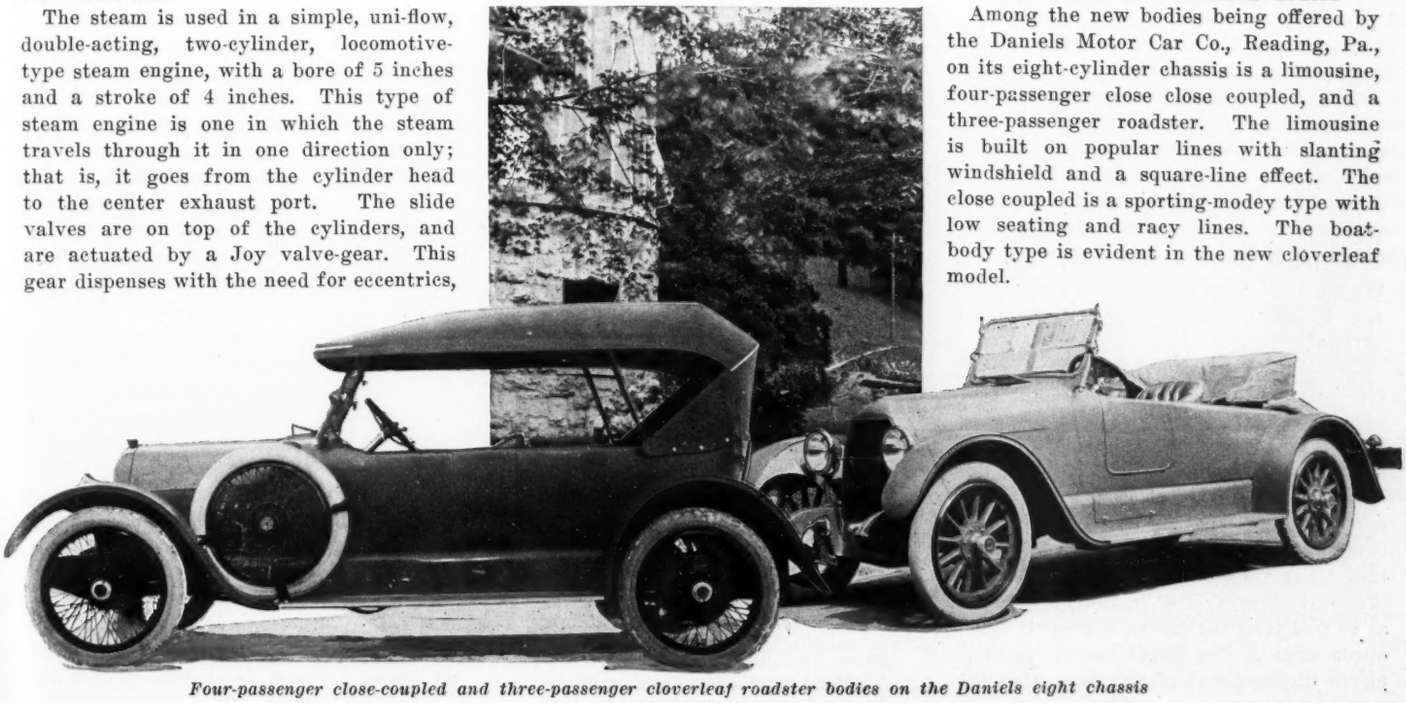
The power is transmitted to the rear axle by means of two perfectly cut spur gears, a forty-seven-tooth gear on the engine crankshaft and a forty-nine-tooth gear on the differential.



Limousine body on the Daniels eight chassis

NEW BODY ON DANIELS EIGHT

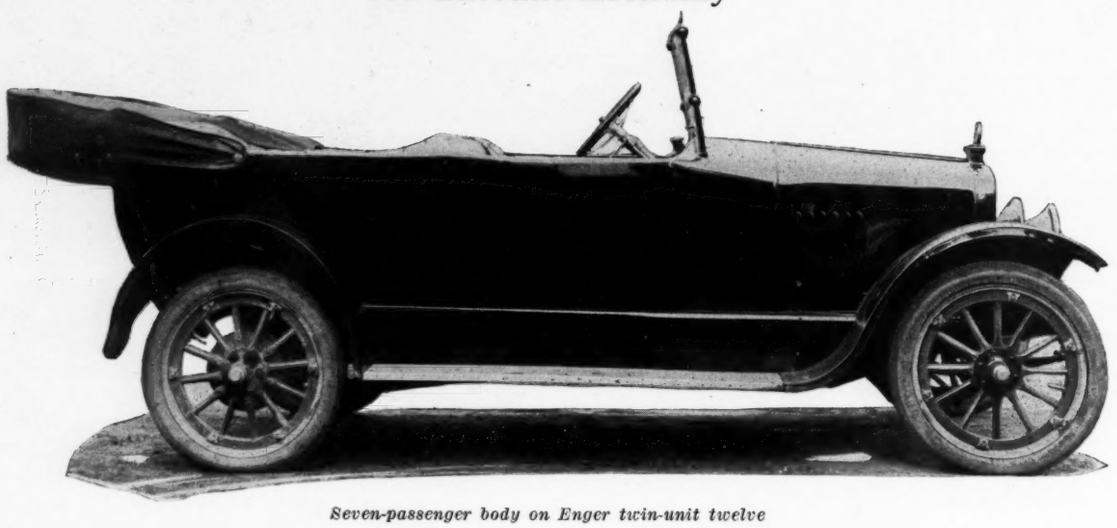
Among the new bodies being offered by the Daniels Motor Car Co., Reading, Pa., on its eight-cylinder chassis is a limousine, four-passenger close close coupled, and a three-passenger roadster. The limousine is built on popular lines with slanting windshield and a square-line effect. The close coupled is a sporting-modey type with low seating and racy lines. The boat-body type is evident in the new cloverleaf model.



Four-passenger close-coupled and three-passenger cloverleaf roadster bodies on the Daniels eight chassis

A Twelve or a Six at the Turn of a Lever

Enger Twin-Unit Twelve Embodies New Feature for Gasoline Economy



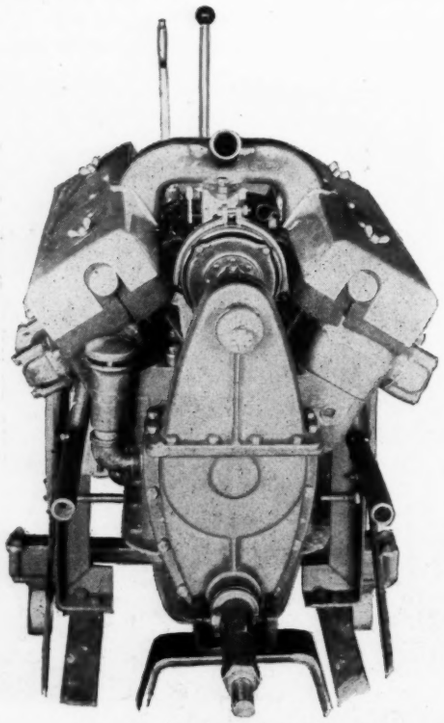
Seven-passenger body on Enger twin-unit twelve

WHAT amounts to an innovation in standard motor car construction is found in the Enger twin-unit twelve for 1917, made by the Enger Motor Car Co., Cincinnati, O. Through the shifting of a lever the Enger may be changed from a twelve to a six. This is the first time that such has been found possible in a stock car. The Schebler, one of the early twelve-cylinder experiments, used some such similar device, but none of these cars ever were marketed, only one having been built.

The principle involved in changing the motor from a twelve to a six is extremely simple. A rod having six cams is placed over the push rods of the exhaust valves on the left block of the V, and by throwing a lever placed on the steering post and under the wheel, this shaft with the cams is turned sufficiently to act upon the push-rods and open the exhaust valves and hold them in an open position until the lever on the steering wheel is thrown back. At the same time the cams open the exhaust valves the turning action of the shaft carrying the cams closes a butterfly valve in the intake manifold to the left block. Thus the six cylinders are cut out, but they act as a compensator for the other six, which, of course, are off from the vertical.

The motor, which is of Enger's own construction, has a very small bore and stroke, being 2⅜ by 3½ inches. This gives it an N. A. C. C. horsepower rating of 27.07 and a displacement of 186.04 cubic inches. Enger's claim for great economy when the car is used as a six seems well taken since it stands to reason that with six cylinders having a total displacement 93.02 cubic inches the motor must be more economical as to fuel than the car with a much larger displacement. The Enger has the smallest piston displacement of any twelve on the market today and from a flexibility standpoint it may be said that all speeds from a point where the speedometer rests at zero up to 60 miles per hour are possible in high with the twelve cylinders in action.

A representative of Motor Age rode in the car over hills and on level stretches and found 40 miles per hour possible with the use of six cylinders and up to 60 with the twelve cylinders in action. On level ground starting was easy with the gear-shift lever in high and under the same conditions, with the clutch in and the gears in high, a touch of the starter pedal was sufficient to start the motor and accelerate to 40 miles within a city block. There was no bucking to the motor when starting in high.



Front view of twin-unit twelve motor, showing method of valve enclosing

The motor is of the valve-in-the-head type and the cylinders are of semi-steel. The main crankshaft bearings, of which there are three, have bronze-backed bushings and unusually large bearing surfaces. Enger has seen fit to line the valve mechanism covers with felt to give greater quietness. Adjustable pushrods operating on ball bearings in ball socketed rocker arms with felt oil retainers also make for quietness. Three thousand revolutions a minute is the maximum motor speed and at this point it is said to develop 55 horsepower.

But one chassis is being built and this, a five-passenger touring type with streamline body and hood and double cowl, sells for $1,295. This is an increase of $200 over the previous twelve of last year, but the 1917 model is greatly improved in appearance over its predecessor. With a wheelbase of 116 inches and cantilever springs in the rear the car rides easy. The rear axle is of the floating type with double row ball bearings throughout and the drive is taken through spiral-bevel gears.

A Stromberg carbureter placed in the V takes the fuel by gravity feed from the tank in the cowl, while the ignition is Remy and the electrical equipment two-unit Westinghouse. Lubrication is by pump, the oil being forced through the hollow crankshaft to the connecting rod bearings. This pump is located at the bottom of the oil pan and it is in this pan that another departure from regular practice is found. Longitudinal tubes are cast in the lower half of the crankcase, which is the oil reservoir and the air rushing through these tubes helps to keep the temperature of the oil lower. It also is contended that the

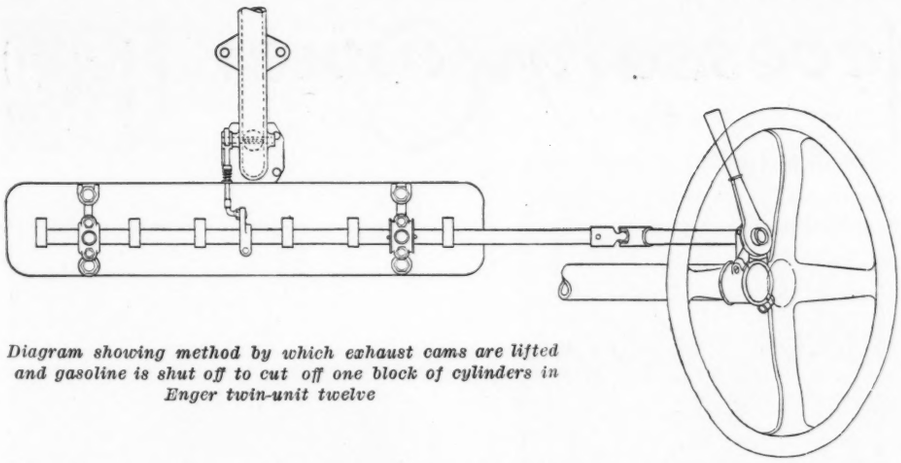


Diagram showing method by which exhaust cams are lifted and gasoline is shut off to cut off one block of cylinders in Enger twin-unit twelve

oil passing into the cylinders not working is further cooled, since these cylinders are doubly cooled through the absence of explosion and the fact that the water from the radiator is not siphoned to that block as it becomes cold.

The clutch is a multiple disk, Raybestos-lined and the housing is partially open to keep it cool. The clutch and gearset run on double annular ball bearings with the exception of the counter gears, which have bronze bearings. Two universals are used in the final drive.

Brakes are of the internal expanding and external contracting type. Tires are 32 by 4, non-skid in rear and plain in front.

Two colors are offered in the 1917 Enger, a light cream and a black and green combination, the latter having the hood, fenders and chassis black and the body and wheels dark green. Other colors can be had at a small additional cost. The upholstery is genuine leather, over curled hair and coil springs. The running boards and floor boards are linoleum covered and aluminum bound.

There is a remarkable absence of square corners in the Enger. The body rolls in a little at the top and the doors have a new design of fastener. When they are opened and the small lever pulled up sufficiently to allow the door to open, a spring-operated stud projects from the door toward the jam and holds the catch up. As the door is closed the jam strikes this stud, which releases the catch and it springs into place. The catches are set inside the door so as not to catch the clothing.

Equipment includes motor-driven horn, speedometer, robe rail, foot rest, one demountable rim and carrier, mohair one-man top and Jiffy curtains, rain vision ventilating windshield set on a slant, tools, etc. There is ample leg room both in the front and rear compartments and the cushions are lower in the back than in the front to give better riding qualities. At present the production is about ten cars a day.

GRANT USED STOCK PLUGS

In the list of equipment used by the cars entered in the Pike's Peak climb, it was stated that the Grant car was equipped with Red Head special sparkplugs. We are advised that the Grant car, which finished in this event, was equipped with Red Head Big Boy spark plugs and they were stock plugs in every detail of their design and construction. They were assembled with the regular porcelain core, and regular nickel-manganese alloy electrode, and had three nickel-manganese alloy firing points.

The reason that the manufacturer, the Emil Grossman Mfg. Co., Inc., Brooklyn, N. Y., suggested this correction is that it is generally assumed that Red Head plugs used by racing men are built especially for speed contests, while the fact is that the materials used in the construction of Red Head spark plugs are tested in races for endurance, and the component parts which pass the test are adopted for stock plugs.

NAMING CAR BODIES

The Society of Automobile Engineers setlled on standard nomenclature of many parts of the car this summer and the recommendations of the Society as to names of different car bodies should assist in clearing up the somewhat hazy condition of car-body nomenclature.

The different types of bodies and their definitions as adopted by the S. A. E. are given below:

Roadster—An open car seating two or three. It may have additional seats on running-boards or in rear deck.

Coupelet—Seats two or three. It has a folding top and full-height doors with disappearing panels of glass.

Coupe—An inside operated, enclosed car seating two or three. A fourth seat facing backward is sometimes added.

Convertible Coupe—A roadster provided with a detachable coupe top.

Clover Leaf—An open car seating three or four. The rear seat is close to the divided front seat and entrance is only through doors in front of the front seat.

Touring Car—An open car seating four or more with direct entrance to tonneau.

Salon Touring Car—A touring car with passage between front seats, with or without separate entrance to front seats.

Convertible Touring Car—A touring car with folding top and disappearing or removable glass sides.

Sedan—A closed car seating four or more all in one compartment.

Convertible Sedan—A salon touring car provided with a detachable sedan top.

Open Sedan—A sedan so constructed that the sides can be removed or stowed so as to leave the space entirely clear from the glass front to the back.

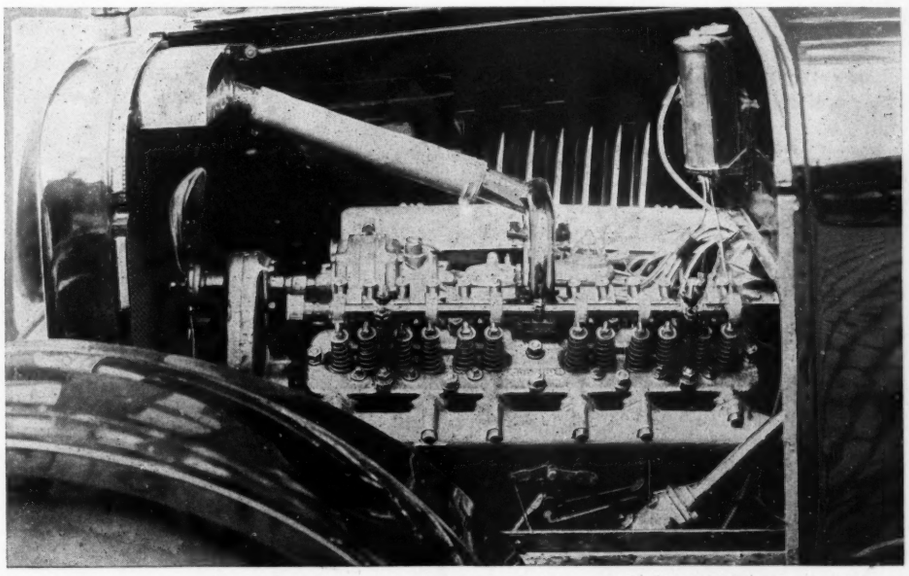
Limousine—A closed car seating three to five inside, with driver's seat outside, covered with a roof.

Open Limousine—A touring car with permanent standing top and disappearing or removable glass sides.

Berline—A limousine having the driver's seat entirely inclosed.

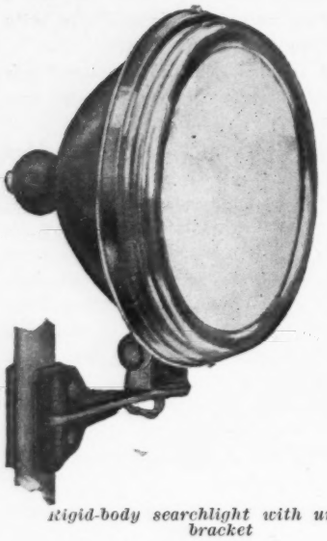
Brougham—A limousine with no roof over the driver's seat.

Landaulet—A closed car with folding top, seats for three or more inside, and driver's seat outside.

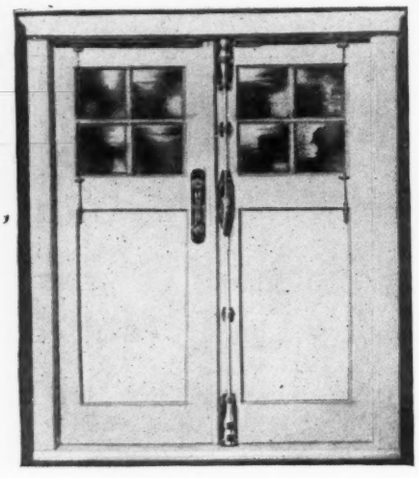


Left side of Enger motor, showing arrangement for lifting exhaust valves

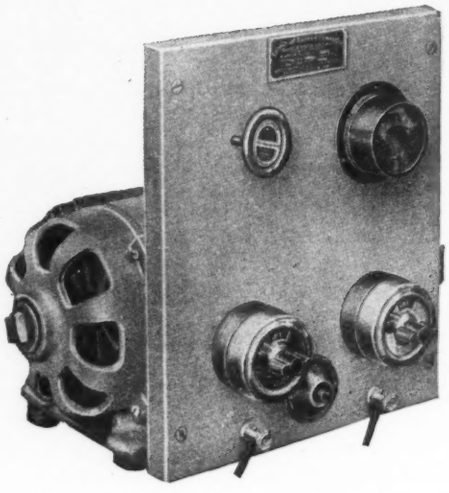
The Accessory Corner



Rigid-body searchlight with universal bracket



Garage door fitted with special Stanley hardware



Charger which utilizes alternating power current

Liquid Carbon Remover

FOUR tablespoons of liquid poured into each cylinder through the spark plug opening or pet cock, allowed to remain in the cylinders 2 or 3 hours, or overnight, the motor started, and the softened carbon is blown clean from the cylinders through the exhaust. This is the claim for Johnson's carbon remover just introduced by S. C. Johnson & Son, Racine, Wis., makers of the prepared wax and cleaner marketed under the same name. The makers say that the liquid is of such a nature that it will not harm the motor or spoil the lubricating oil in the crankcase.

Small Battery Charger

The Ellington small battery charger consists of a motor, generator, panel and instruments. It operates on the high-voltage alternating-current supply, and delivers a low-voltage direct current to the batteries. The motor is of squirrel-cage type, with no friction parts. Cooling vanes and vents send cool air over the windings. The apparatus is two-bearing, the motor and generator having a common shaft. Any desired rate of current from 15 amperes down can be given the batteries. When the rate is adjusted at the start of the charge it will automatically taper as the charge progresses. No attention need be given to the order in which the battery terminals are connected to the charger leads, as the apparatus will adjust its polarity automatically. Control is by switches on the panel. The Ellington Electric Co., Quincy, Ill., is the maker.

Bar Circle Penn Tire

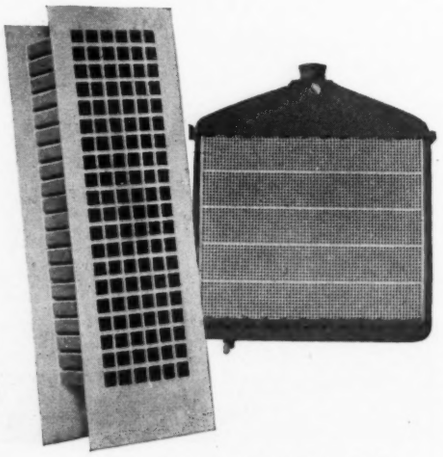
A popular-priced tire is now included in the line of the Pennsylvania Rubber Co., Jeanette, Pa., which has a distinctive tread design. The tread is of tough black rubber of high quality. The design, as indicated by the name, bar circle, is a combination of heavy bars and circles. A 3,500-mile guarantee is attached to each casing. The price of bar circle tires, according to the company's announcement has been figured on cost of production with a daily output of 3,000 casings.

Instantaneous Rim Bolts

A tire change in 2 minutes is the claim when wheels are equipped with instantaneous demountable rim bolts. The tire is released by a half turn of the bolts which releases the clamp holding the rim, and is replaced in the inverse manner by turning the bolt a half turn to its original position. There is a wedging bolt through the wood rim on one end of which is a lock nut and on the other an L-shaped bolt. By turning the L bolt up, the lock nut depresses a spring which locks the rim in place.

Radiator Built in Sections

The uni-tube is a sectional radiator built in three, four or five sections, according to size. In case of accident, the damaged section can be removed and repaired or replaced without interfering in any way with the other sections. The air tubes are single and separate, being placed $\frac{1}{16}$ inch apart every way, thereby giving free course to the water which circulates about them. Should the radiator spring a leak it can be easily located by examining the tubes. The defective tube can then be removed and replaced by another in a few minutes at a small expense. In case a leak is discovered on the road the end of the defective tube may be plugged with a cork until a permanent repair can be made. It is claimed that freezing does not damage the radiator, as the water surrounding the tubes forming the air passages, when frozen, presses the tubes inward instead of expanding and bursting them. The Kayman Auto Radiator Co., Syracuse, N. Y., manufacturer of the radiators, is in a position to make up these parts of any specified design.



Uni-tube radiator, which is built in removable sections

Garage Hardware

Plain and ornamental wrought-steel hardware for garages is described and illustrated in a booklet recently issued by the Stanley Works, New Britain, Conn. Stanley garage-door hinges are equipped with ball-bearing washers. The wearing surfaces do not grind together when the door swings, because of these bearings. The bearings also are designed to prevent the doors from wearing down and sagging. The hinges, door holders, bolts and other fittings have been especially designed for garage use. They are planned for brick, cement and wooden buildings and for many special conditions, such as where doors cannot be swung out.

Universal Bracket Searchlight

A bracket which permits the operator to twist the spotlight in any desired direc-

tion without danger of breaking off the electric wiring, is a part of the searchlight equipment in the line offered by the Kilborn-Sauer Co., Fairfield, Conn. There is a push-and-pull type of switch in the handle. The lights are made with rigid body and handle of one-piece heavy metal. Equipment includes nitrogen bulbs of 21 candlepower. Reflectors are silverplated. The line includes plain spot lights and lights equipped with diminishing mirrors. Prices are: 6-inch diameter, plain, $6; 6-inch diameter with 4-inch diminishing mirror, $7; 8-inch diameter, plain, $9; same with 4-inch diminishing mirror, $10.

Ford Breather Pipe

A breather pipe for the crankcase of Ford cars sells for 50 cents. An upright pipe, containing a fine screen is secured to the oil intake by a hooked bolt that fastens around the timer retaining bolt. The installation is said to make the renewing of the oil supply an easy matter and to prevent the oil from spraying from the crankcase. The cover is easily removed or replaced, and the screen prevents the entrance of foreign elements. The Auto Parts Co., Providence, R. I., is the manufacturer.

The Aerofram Valve

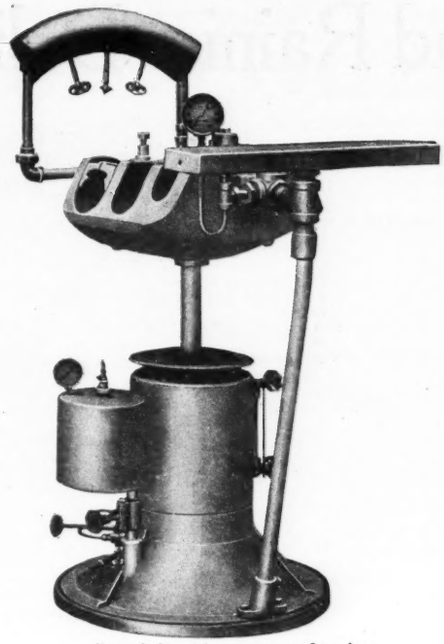
Aerofram Co., Inc., 107 Massachusetts Ave., Boston, makes an auxiliary air valve in the intake manifold, operated automatically by suction. A metal plug houses the valve and is screwed into a ⅛-inch tapped hole in the manifold just below the spread. The price is $1.

Special Pistons

Standard cast iron, semi-steel or aluminum-alloy pistons are made for any make of car by the Butler Mfg. Co., Indianapolis, Ind. The semi-steel and aluminum alloy pistons are made extremely light and provided with supporting ribs for strength. All pistons are drilled in a groove below the rings to provide a return for the excess oil. Cylinders are reground and oversize pistons fitted by this company.

Machinists' Vise

A light-weight swivel-base vice suitable for the repairshop is a product of the Fulton Mach. & Vice Co., Lowville, N. Y. The jaws are cast steel welded onto the face of the vice giving a very strong construction. The vice may be swiveled to any desired position and firmly locked by a taper head bolt. Price for 3-inch jaw, $7.50; 4-inch jaw, $10.50.



Grand Rapids steam vulcanizer

Trump Jack Set

The car may be readily lifted from the floor by means of trump jacks. By means of a compound lever caught beneath the hub, the wheel is lifted free from the floor and locked in the raised position. The strain on the tires is thus relieved and the tires are removed from contact with an oily floor. The height of the jacks may be adjusted and it is said that each jack will support 5,000 pounds. The Trump Products Co., Garland Bldg., Chicago, is the manufacturer and the price per set of four is $5.

Motor Car Monogram

There is now obtainable a distinctive monogram that may easily be attached to any car and just as easily transferred to another. All monograms are hand-engraved and enameled in any color on sterling silver. Any special design will be made up on order without extra charge. C. F. Essex, 306 Central Ave., Jersey City, is the maker and the price is $10 per pair.

Superlustre Polish

Superlustre polish is for cleaning the surfaces of car bodies without injury, and is said to leave a glass-like finish upon which dirt and dust cannot accumulate. By the use of this polish the manufacturer states that the car may be driven or washed in rainy weather without ill effects. A scratch and stain remover is also supplied that is an emergency mixture and is to be used only when the surface is such that no polish will give satisfactory results. It will prepare the surface for the superlustre polish. The compound is made by Jas. J. Ferro, Inc., 792 Seventh Ave., New York. A can of 20 ounces costs $1.50.

Miscellaneous Parts

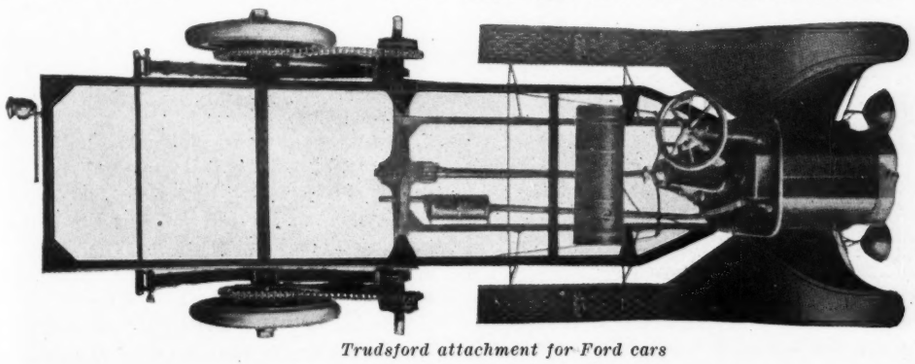
The Detroit Screw Works, Detroit, is marketing an assortment of parts that have been rejected because of some slight imperfection that in no way affects the strength and usefulness of the piece. It comprises set and cap screws, studs, taper pins, bolts, nuts and all manner of special pieces, different shapes and sizes, and bar ends. In repairshop work, just the piece wanted can often be found and used with little alteration. A 100-pound assortment costs $4.

Truck Attachment for Fords

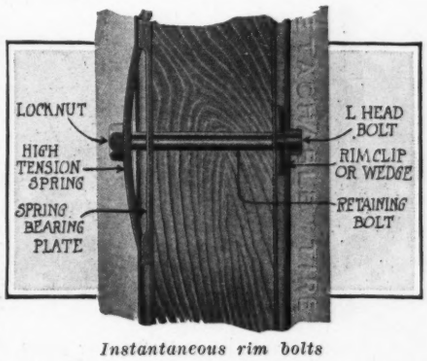
The truckford attachment converts a Ford into a 1-ton truck, leaving the chassis intact. The Ford rear axle becomes the jackshaft and carries the sprockets for the chain drive, the attachment bolting on over the frame. The lengthened frame gives a loading space of 8½ to 11½ feet back of the driver's seat. The wheelbase created is 128 inches. Solid rubber tires are used on the rear and carry almost the entire load. The truckford may be attached by two men in a short time, and may readily be removed and the original body replaced. The Robinson Machine Co., Detroit, is the maker and the price is $350 complete.

Automatic Vapor Injector

The Vapor Gasoline Economizer Co., 127 Broadway, New York City, has introduced a device for introducing heated water vapor into the mixture of a gasoline engine. The vapor valve automatically controls the amount of vapor, and none is admitted at slow or idling engine speeds. Vapor is taken from the water of the radiator by means of a valve attached to the overflow pipe and this valve separates any water that may be present from the vapor. The vapor is conveyed through a flexible-metal tube coiled around the exhaust manifold to a compensating valve located above the carbureter.



Trudsford attachment for Ford cars

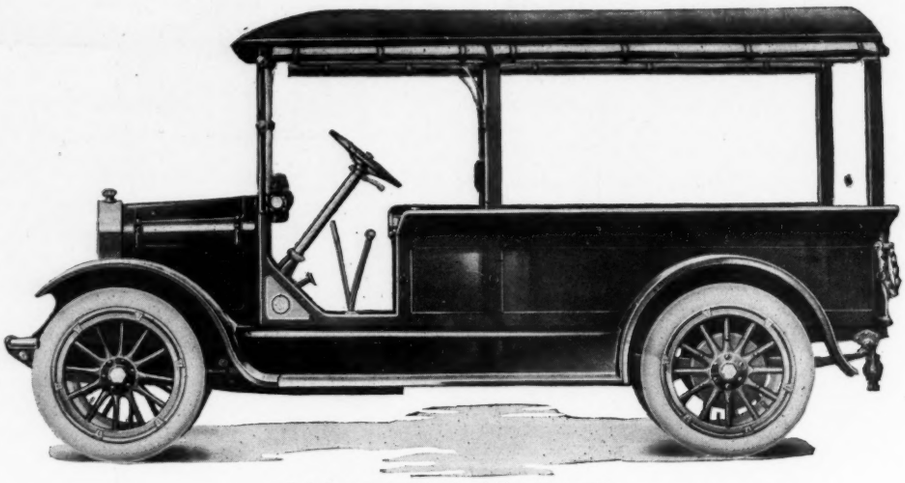


Instantaneous rim bolts

1,000-Pound Rainier Delivery Wagon

JOHN T. RAINIER, who used to make pleasure cars, is now associated with P. N. Lineberger, in the manufacture of a 1,000-pound delivery wagon to sell for $850. Production will start in October on this car, which is to be known as the Rainier. This is the first time this name has been linked with a motor vehicle since the absorption of the Rainier interests by the General Motors.

The frame has been carried very low and all of the way back to the tailboard, to eliminate any body overhang. The cab floor hugs the frame closely and with the footboard and dash is a single steel stamping. Fenders are wide and follow the curvature of the wheels in the approved style. Running boards extend the full length and are covered with aluminum. The tubular bumper at the front is secured to brackets integral with the front spring horns.



Rainier express-body delivery wagon

Tires are 33 by 4 inches all around, and mounted on demountable rims. The 115-inch wheelbase permits of the use of larger bodies than is customary on ½-ton cars and this has been taken advantage of by the design of a number of distinctive body features, as for instance, the length of 74 inches of load space back of the driver's seat.

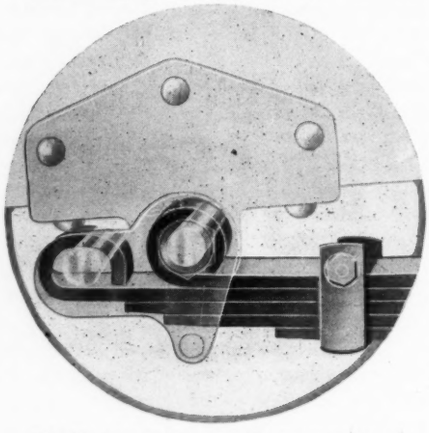
Block-cast Motor

The engine is a block-cast unit of the high-speed type. It has two bearings and is very compact due to integral casting of the cylinders, crankcase and both manifolds. The cylinder heads are in a separate casting.

With a bore and stroke of 3¼ by 4½ inches, it rates 16.92 horsepower by formula but at 2,000 revolutions per minute it develops, according to the makers, 28 horsepower.

The Carter multple-jet carbureter of 1⅛-inch size, bolts to the inlet pipe on the left side, just behind the Dixie magneto and has an air control on the dash. The magneto is driven from the timing gear-case by a leather coupling from the fan-belt pulley. It is fitted with a dash spark control.

Circulating-splash lubrication is employed, the oil being strained and pumped from the reservoir by a plunger pump eccentric-driven from the camshaft. This delivers the oil to troughs beneath the cranks. Overflow is fed by a pipe to a groove cut in the inner face of the camshaft gear, communicating with the gear teeth by holes drilled between them. Pockets also collect the splashed oil and direct it to the main and camshaft bearings. Excess oil splashed on the cylinders is prevented from causing smoking by holes drilled in each piston below the scraper ring. There is an oil gauge on the dash and a level indicator at the side of the crankcase.



Double rear-spring shackle for purpose of safety on Rainier truck

A Borg & Beck three-plate dry clutch drives the Grant-Less three-speed selective gearset. This clutch is adjusted by shifting two bolts.

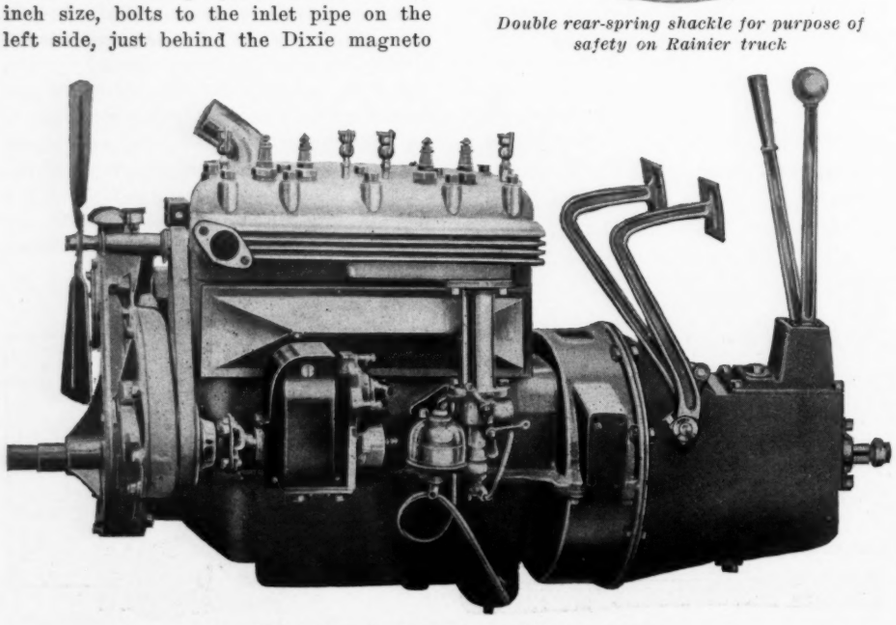
Standard equipment consists of one extra rim, three oil lamps, the front lamps being attached to the rear of the dash, with their lenses flush, a Long horn, a tire pump, jack and full set of tools. Electric lighting and starting will be applied for $85 additional.

Several Bodies Offered

Several standard bodies are offered, modeled upon the designs used by leading New York department stores. The open express type, 74 inches long and 44 inches wide, known as Model E sells for $100.

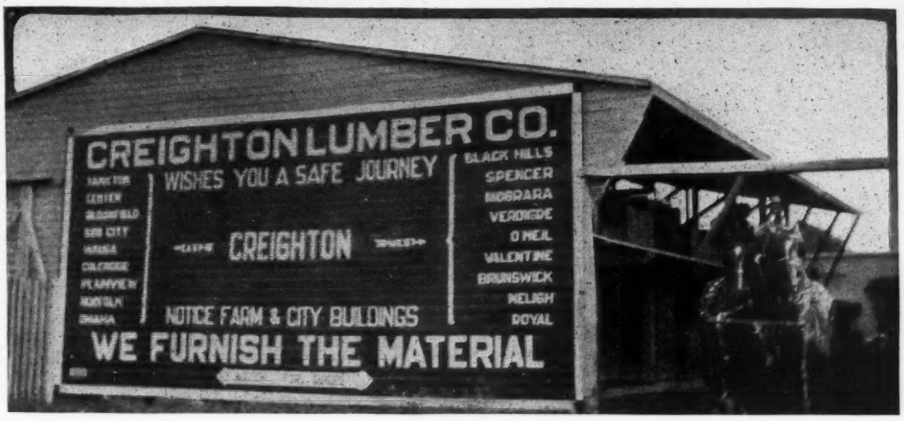
The frame is of unusual size, being 4½ inches deep, of $\frac{5}{32}$-inch gauge pressed steel, and properly necked in at the front to provide a short turning radius. This is a clear inch deeper than on some trucks of the same rated capacity.

The front axle is of Timken make, I-beam type, of 2½-inch section, having nickel steel steering knuckles. The steering gear is at the left, of Gemmer make, with an 18-inch hand wheel. The throttle lever is below the wheel, of the same type as applied to Renault cars. The throttle is principally controlled by a foot throttle. The levers are in the center of the cab.



Unit-power plant in Rainier delivery wagon

From the Four Winds



ASSURING TOURIST OF GOOD WISHES—The above illustration was sent to Motor Age by one of its readers, Dr. C. C. Johnson, Creighton, Neb., and shows how the Creighton Lumber Co. welcomes the motorist and bids him Godspeed on leaving.

WOMAN Demonstrates Fords—Mrs William J. Mendenhall, wife of the president of the Mendenhall-Sievers, St. Louis, Mo., Ford distributors, is conducting daily demonstrations of the Ford car for interested women.

Two Blocks Without License; $11.25—Mrs. Margaret K. Austin, Brooklyn, N. Y., essayed to drive motor car in Millville, N. J., without having the necessary license or permit and was unluckily held up by Inspector Lovett. She was taken before a magistrate and fined $11.25, having driven the car but two blocks.

Inspector Arrests Speeding Life Savers—Motor Vehicle Inspector William H. Lovett became a little overzealous at Ocean City when he spied a car exceeding the speed limit. After arresting the driver he found that the car was being used by life guards to rush a half-drowned man to the beach hospital. He finally hailed the driver into court but the magistrate discharged him after hearing the evidence.

Maine Cars Increase—Maine is getting a large revenue from the motorists this year. A few days ago the receipts had totaled $341,367.75. For 1915 the state received $271,987, so the present total is $69,380.75 greater than for all of last year. If the cars continue to increase the state will get at least $100,000 more than a year ago. Up to the middle of August there had been a substantial increase all along the line compared to the same period of a year.

Composite Flivver Is Fast Mail Car—Rural Carrier C. C. Dowling, Monroeville, N. J., is giving the patrons of his route a fast mail service with a car that is as near strictly home-made as could be had. Dowling has been collecting parts and the result is a car with an early model Ford engine, a Metz friction transmission, Maxwell axles and several other makes of various parts. Dowling claims that he gets 16 miles to the gallon of gas with his home-made bus.

Woman Octogenarian Drives Car—Aunt Sarah Hewitt, Danville, Ill., is 83 years of age, yet drives her own car. She is believed to be the oldest woman driver in the world. "Dr. Osler was wrong," she remarked recently when congratulated over her success in operating a car. "I can keep pace with the world, do my share of the work, and take my share of the pleasure, even though I am nearly a quarter of a century past the mark at which Dr. Osler asserted people should be chloroformed, having outlived usefulness. I covered in 22 minutes, the distance that required three to four hours a half century ago," she said. She has owned a car for two years.

Fords Given Away with Every Sale.—Thomasson and White, Chicago real estate operators, are advertising that they will give a five-passenger Ford to anyone who will buy a flat building.

Animal Hospital Car Salesroom—B. A. Robinson, Independence, Kan., has discontinued his hospital for animals, and converted his infirmary into Studebaker salesroom and service station. He has associated with him Charles Shultz, and has employed a competent mechanic. He will continue the practice of his profession, without the hospital; he is a veterinary surgeon.

Philadelphia Telegraph Motor Delivery—The Philadelphia office of the Western Union Telegraph Co., is experimenting with motor cars for delivering messages. Two are in use and many more will be added if this plan proves economical. If messenger boys in delivering messages by the new method continue to read novels on the way traffic conditions are likely to become much more congested.

Missouri Cars Increase—At the end of August 180,000 licenses had been issued in Missouri, more than 25,000 in excess of the total of last year. Of these, 19,453 were in St. Louis; 11,954 were in Kansas City. The license fiscal year begins February 1.

Studebaker Runs on Rails—The Maryland and Pennsylvania railroad recently purchased a Studebaker four, had the wheels removed and metal flanged wheels substituted, and operates the car over steel rails on tours of inspection. The Studebaker runs 40 miles an hour on railroad schedule, and averages 22 miles to the gallon of gasoline.

Ohio Wage Statistics—According to the report of George F. Miles, chief statistician of the state of Ohio, of the $29,030,965 paid out in Summit county in wages during the last year, 61.1 per cent, or $21,733,088, was paid out by rubber plants. The second largest payroll in the county is given by foundry and machine shops, much of which is connected with the motor car industry. In Lucas county, where Toledo is located, $10,089,214 out of a total of $35,343,043 was paid out by motor car factories.

New Hampshire License Fees—New Hampshire motor vehicle owners will pay into the state treasury this year upwards of $325,000. Up to date the fees have run above $300,000, while last year they reached $257,000. More than 16,000 cars have been registered this year and about 1,600 of them, or 10 per cent, are those of non-residents. Last year visiting motorists paid more than $15,000 into the state treasury. As September and October are good touring months many more visitors are expected in the state and as the limit is but 10 days for them the fund is bound to swell.

Motors for School Children—Thirty-three school districts of the state of Washington are now provided with motor cars to carry pupils to and from school. The clerks of the districts are unanimous in their opinion that the motor busses are safer, surer, more convenient and less expensive. Motor busses were first used in the state in districts in which the pupils were widely scattered. It was found that under this condition the motor bus could cover the long distance in a shorter time than a horse. The drivers who carry the pupils are obliged to sign a contract with the district. In this way the driver is obliged to maintain a regular schedule.

Coming Motor Events

September 18—Track meet, North Yakima, Wash.
September 29—Track meet, Trenton, N. J.
September 30—New York, Sheepshead Bay speedway race.
October 7—Philadelphia speedway race.
October 7—Omaha speedway race.
October 14—Chicago speedway race.
October 19—Indianapolis speedway race.
October 21—Track meet, Kalamazoo, Mich.
*November 16—Vanderbilt cup race, Santa Monica, Cal.
November 30—Speedway, Los Angeles, Cal.
December 25—Speedway, Los Angeles, Cal.

*Sanctioned by A. A. A.

SHOWS

September (date undecided)—Cleveland.
September 25-30—Salem, Ore.
October 14-31—Dallas, Tex.
January 6-13—New York show.
January 13-20—Montreal.
January 27-February 3—Chicago show.
March 3-10—Boston.

REO Trucks Complete with Railroads—Can the motor truck compete with railroads and maintain a regular freight schedule? A fleet of Reo trucks does that and cheapens transportation charges, too, for the Transportation Service Co., Richmond, Ind. This firm is successfully competing with two railroads and an interurban company. The freight schedule maintained by Transportation Service Co., so effectively beat the schedule of the railroads competing, that shippers are now throwing all their business to the Transportation Service Co. The accompanying illustration pictures a fleet of thirteen of the 2-ton jobs driven overland to the Transportation Service Co., that 2 years ago purchased one Reo 2-ton truck and established a freight service between that city and New Paris, O., a town of 800 inhabitants, 20 miles distant. In competition with two railroads and an interurban line, it carried practically all of the freight and operated on a time schedule. Richmond being centrally located, it was decided to inaugurate the same service to other points. This resulted in the establishment of a passenger and freight station in the center of the city for lines operating between New Paris, Eaton, Hollinsburg, and Greenville, O., College Corner, Oxford, Liberty, Cambridge, Linn, Hagerstown, Carlos City, and Union City, Ind.

Good Roads Activities

Club Marks Road—The Tacoma Automobile Club, Tacoma, Wash., has completed posting road signs on some 350 miles of highways tributary to Tacoma. The Olympic highway has been marked for a distance of 200 miles, while the Pacific highway to the south and many of the shorter roads to the northeast have now been marked.

County Will Pay if State Fails—If the Egan good-roads bill, awaiting ratification by the voters at the coming elections in New Jersey, fails to be approved, thus cutting out an appropriation for a paved road from Camden, N. J., to Atlantic City, the Atlantic county board of free-holders will assume the expense of paving the White Horse pike from Absecon to the Camden county line with Warrenite, eighteen feet wide. The road from Atlantic City to Absecon is already paved with this and other material.

Oppose Jersey Good-Roads Bill—On the ground that the Egan good-roads bill, recently passed by the New Jersey legislature, and which is to be submitted to the voters for ratification at the coming elections, provides for double the improvements that can possibly be made with the $7,900,000 bond issue it carries, and that "pork" for the various legislators is making a poor outlook for 1,000 miles of roads instead of good provision for 525 miles as first decided upon, Colonel Edwin A. Stevens, state commissioner of roads, has officially rejected the whole proposition and will fight the measure at the polls.

Better Nova Scotia Roads—The Halifax Automobile Association, Halifax, N. S., is going to make a big drive at the local government this fall with the idea of getting it to adopt a comprehensive policy for the betterment of roads throughout the province of Nova Scotia. And in order to get some weight behind the movement the association purposes holding a good roads convention in Halifax between September 13 and September 21.

Jersey Gets $59,112.58 for Good Roads—The New Jersey state highway department has announced that the state is to receive as its share of the federal aid, $59,112.58, based on an area of 8,224 square miles, a population of 2,537,167, and 7,708 miles of star and rural mail routes; being 1.22088 per cent of the total federal appropriation of $4,855,000 apportioned among the states. This money will be used on the Pennsgrove-Malaga road in Salem county; the Layton-Dingman's Ferry road in Sussex county; the Essex-Middlesex pike in Middlesex county, and Springfield avenue. Cranford, Union county.

New Boulevard Connects Jersey Resorts—The Longport-Somers Point boulevard, the last link in the improved highway connecting southern New Jersey coast resorts, has been completed. This new ocean boulevard now allows of a complete tour of South Jersey seashore points from Atlantic City to Cape May and return without touching the same road twice. Many attractive small beach resorts have been made more easily accessible and are expected to develop on account of increased traffic.

With the Motor Clubs

Canadian Club Formal—The North Renfrew Motor Club, Pembrose, Ont., has been organized with a membership of forty-six. The following officers were elected: President, Dr. G. E. Josephs; vice-pres., A. L. Eastcott; secretary-treasurer, John P. Millar; executive committee—the officers and W. L. de La Ronde and F. P. Shepherd.

Club Would Furnish Chauffeurs—The Automobile Club of Canada, Montreal, Que., is studying conditions with regard to improving matters relating to chauffeurs. There is a great scarcity and a proposal is under consideration for keeping a register of good men and issuing them certificates under the seal of the club, which would be renewable each year and on which their records as drivers would be entered. This is a protection to the chauffeurs themselves as well as to the members who employ them. The club tries to secure competent men for members who are in need of drivers, but at present there are a number of good positions open, and it is felt that something should be done to assist both parties to get together for their mutual benefit.

New Colorado Club—The Elbert County Motor Club, with headquarters at Elizabeth, Colo., was just recently organized to promote good roads and motoring activities in that section, and now has ninety-six members. The officers of the new organization are: President, Thomas Burnside; first vice-president, A. G. Cornforth; second vice-president, William D. Riley; secretary, B. F. Rice; treasurer, Ole Olson. The club has also elected fifteen directors, including the officers and the following: H. A. McLennan, C. W. Reed, E. E. Gray, Bernie Gleason, Fred Albin, George Gresham, William Mattison, Jack Wood, W. H. Kellogg and Theodore Neuman.

Recent Incorporations

Albany, N. Y.—Nichols & Webster; motor car parts, accessories, etc.; capital stock, $10,000; incorporators, W. B. Hughes, W. H. Webster, J. C. Nichols.

Cleveland, O.—Carris-Franklin Co.; capital stock, $40,000; to deal in motor cars and supplies; incorporators, Ralph H. Frank, C. S. Carris, G. H. Gallagher, Frank W. Caldwell and F. H. Crew.

Cincinnati, O.—Heisey Robbins Co.; capital stock, $15,000; to deal in motor car accessories; incorporators, S. A. Headley, Frank E. Wood, Marten Allen, Rose Schook and Katherine Smith.

Cincinnati, O.—Springford Manufacturing Co.; capital stock, $15,000; to manufacture and deal in motor car supplies; incorporators, Anthony Bury, Albert Ficks, George A. Bury, E. C. Shumard and C. A. Heilker.

Cincinnati, O.—Quick Tire Service Co.; capital stock, $100,000; to operate a tire agency; incorporators, C. H. Lambert, A. F. Gartside, C. L. Swain, G. G. Gillette and Edgar C. Buck.

Detroit, Mich.—Marquette Machine Co.; capital stock, $10,000; to make motor car parts; incorporators, Ralph W. McMullen, Charles J. Schilling and Freeman N. Paterson.

Dodge City, Kan.—Southwest Motor Co., distributors of Paige; incorporators, Cecil Newby, Ralph Pryor and Fred Jones.

Eau Claire, Wis.—Eau Claire-Chippewa Buick Co.; to deal in Buick and other cars, and operate a garage and service station; capital stock, $10,000; incorporators, C. H. Dickson, A. J. Podlawitz and W. F. Horn.

East Moline, Ill.—National Auto Signal Co.; capital stock, $5,000; incorporators, J. B. Merwin, H. M. Orman, L. B. Orman.

Grand Rapids, Mich.—Chandler Motor Sales Co.; capital stock, $25,000; to deal in motor cars; incorporators, George W. Van Every, Fred H. Peck and Amos Gezon.

Gary, Ind.—Wing Motor Car Co.; capital stock, $10,000; incorporators, Joseph Fluxman, A. A. Feder and William Feder.

Indianapolis, Ind.—Reagan Automobile Co.; to buy and sell motor cars, etc.; capital stock, $35,000; incorporators, Grace W. Reagan, M. E. Reagan, J. F. Ohmansick.

Indianapolis, Ind.—Olin Sales Co.; to buy, sell and deal in motor cars; capital stock, $1,000; incorporators, W. G. Olin, B. E. Eischer, G. A. Schilling.

Kansas City, Mo.—Bapst Motor Co.; to deal in motor cars and trucks; capital stock, $5,000; incorporators, R. E. Watson, M. S. Neal and G. H. Bapst.

Kansas City, Mo.—Hathaway Motor Co.; to deal in motor cars and motor vehicles; capital stock, $15,000; incorporators, C. E. Hathaway, M. A. Hathaway and H. C. Page.

Lansing, Mich.—Wolverine Auto Sales Co.; capital stock, $10,000; incorporators, Frank S. Vandervoort, H. H. Henkel, F. J. Whitmeyer.

Laurel, Del.—Marvil-White Co.; to manufacture motor cars and operate a garage; capital stock, $25,000.

Milwaukee, Wis.—The Northwestern Motor Car Co.; to sell new and used cars, operate a garage, etc.; capital stock, $5,000; incorporators, Fred Bodenhagen, Jr., Louis A. Steinkamp and Julius O. Roehl.

Moline, Ill.—Hepburn & Pope Motor Sales Co.; capital stock, $5,000; incorporators, G. C. Hepburn, Henry Pope and E. M. Waggoner.

Millbrook, N. Y.—Kelsey Wheel Co.; to manufacture motor car accessories, wheels, bodies, brake drums, etc.; capital stock, $13,000,000; incorporators, E. E. Holmes, A. E. Moore, D. Havens.

Muncie, Ind.—Boyce-Zuber Co.; to buy and sell motor cars, etc.; capital stock, $10,000; incorporators, W. H. Boyce, C. C. Zuber, E. E. Zuber.

New York—Triple Thread Tire Co.; to manufacture and deal in motor car accessories; capital stock, $500,000.

New York—Crow Motor Sales Co.; to manufacture parts, accessories, etc.; capital stock, $25,000; incorporators, J. A. Jennings, C. Burgess, A. L. Goody.

Springfield, Mass.—Motor Industry Appliance Co.; capital stock, $50,000; incorporators, Frank W. Arthur, A. C. Schmeizer, B. F. Arthur, R. S. Miles.

Waterville, Wash.—Waterville Auto Co.; capital stock, $30,000; incorporators, N. P. Nelson, H. T. Sutis, E. Pfueller, Harmon Wilcox, L. J. Laymance.